FEEDSTOCKS

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Primary Biomass Feedstocks

Primary biomass is produced directly by photosynthesis and includes all terrestrial plants now used for food, feed, fiber and fuelwood. All plants in natural and conservation areas (as well as algae and other aquatic plants growing in ponds, lakes, oceans, or artificial ponds and bioreactors) are also considered primary biomass. However, only a small portion of the primary biomass produced will ever be harvested as feedstock material for the production of bioenergy and bioproducts.

Primary biomass feedstocks are thus primary biomass that is harvested or collected from the field or forest where it is grown. Examples of primary biomass feedstocks currently being used for bioenergy include grains and oilseed crops used for transportation fuel production, plus some crop residues (such as orchard trimmings and nut hulls) and some residues from logging and forest operations that are currently used for heat and power production. In the future it is anticipated that a larger proportion of the residues inherently generated from food crop harvesting, as well as a larger proportion of the residues generated from ongoing logging and forest operations, will be used for bioenergy. Additionally, as the bioenergy industry develops, both woody and herbaceous perennial crops will be planted and harvested specifically for bioenergy and bioproducts end-uses.

Because this version of the Data Book is focusing primarily on the bioenergy industry as it exists today, including the biomass feedstocks actually used, only information on the grain and oilseeds crops are included. It would be desirable to include information on the amount and types of crop residues and forest logging, or pulp fiber residues currently being used for energy on a state by state basis, but that information is not readily available. Clearly there is also no nationwide source of information on woody or herbaceous crops being used for energy since this is occurring only on a very small scale in a few isolated experimental situations.

This Data Book covers only current usage of biomass and does not attempt to address the potential for biomass feedstock. Nonetheless, other sources of information do exist concerning the future potential of biomass. Tables, maps and explanations for assumptions behind the potential biomass resource calculations that have been performed by Oak Ridge National Laboratory biomass economists can be found on the Bioenergy Feedstock Information Network (BFIN) website at www.bioenergy.ornl.gov.

Source: Lynn Wright, Oak Ridge, TN.

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Barley: Area, Yield, Production, and Value, 1996-2009

Year	Area		Yield per harvested acre	Production	Marketing year average price per bushel received by farmers	Value of production
	Planted[a]	Harvested				
	1,000 Acres	1,000 Acres	Bushels	1,000 Bushels	Dollars	1,000 Dollars
1996	7,094	6,707	58.5	392,433	2.74	1,080,940
1997	6,706	6,198	58.1	359,878	2.38	861,620
1998	6,325	5,854	60.1	351,569	1.98	685,734
1999	4,983	4,573	59.5	271,996	2.13	578,425
2000	5,801	5,200	61.1	317,804	2.11	647,966
2001	4,951	4,273	58.1	248,329	2.22	535,110
2002	5,008	4,123	55.0	226,906	2.72	605,635
2003	5,348	4,727	58.9	278,283	2.83	755,140
2004	4,527	4,021	69.6	279,743	2.48	698,184
2005	3,875	3,269	64.8	211,896	2.53	527,633
2006	3,452	2,951	61.1	180,165	2.85	498,691
2007	4,018	3,502	60.0	210,110	4.02	834,954
2008	4,246	3,779	63.6	240,193	5.37	1,259,357
2009[b]	3,567	3,113	73.0	227,323	4.40	917,500

Source: U.S. Department of Agriculture, *2010 Agricultural Statistics*, Table 1-53 and previous annual editions.
http://www.nass.usda.gov/Publications/Ag_Statistics/index.asp

[a] Barley sown for all purposes, including barley sown in the preceding fall.
[b] Preliminary

Section: FEEDSTOCKS
Barley: Area, Yield, and Production, by State, 2007-2009

	Area planted[a]			Area harvested			Yield per harvested acre			Production		
	2007	2008	2009[b]	2007	2008	2009[b]	2007	2008	2009[b]	2007	2008	2009[b]
	1,000 Acres	1,000 Acres	1,000 Acres	1,000 Acres	1,000 Acres	1,000 Acres	Bushels	Bushels	Bushels	1,000 Bushels	1,000 Bushels	1,000 Bushels
Arizona	33	42	48	31	40	45	110	120	115	3,410	4,800	5175
California	85	95	90	40	60	55	64	55	54	2,560	3,300	2970
Colorado	60	80	78	58	72	77	120	120	135	6,960	8,640	10395
Delaware	21	25	28	19	22	26	78	80	70	1,482	1,760	1820
Idaho	570	600	530	550	580	510	78	86	95	42,900	49,880	48450
Kansas	20	17	14	13	10	9	52	37	51	676	370	459
Kentucky[c]	10	8	***	3	7	***	37	88	***	111	616	***
Maine	18	20	16	17	19	15	65	55	55	1105	1045	825
Maryland	45	45	55	30	35	48	82	90	70	2,460	3,150	3360
Michigan	14	12	13	13	10	11	51	46	51	663	460	561
Minnesota	130	125	95	110	110	80	54	65	61	5,940	7,150	4,880
Montana	900	860	870	720	740	720	44	51	57	31,680	37,740	41,040
Nevada[c]	3	3	***	1	1	***	90	100	***	90	100	***
New Jersey[c]	3	3	***	2	2	***	68	71	***	136	142	***
New York	13	13	12	11	9	10	49	52	53	539	468	530
North Carolina	22	21	23	14	14	19	49	71	60	686	994	1,140
North Dakota	1,470	1,650	1210	1,390	1,540	1,130	56	56	70	77,840	86,240	79,100
Ohio[c]	4	6	***	3	5	***	53	72	***	159	360	***
Oregon	63	57	40	53	42	32	53	50	60	2,809	2,100	1,920
Pennsylvania	55	60	60	42	55	45	73	75	75	3,066	4,125	3,375
South Dakota	56	63	48	29	43	22	40	41	54	1,160	1,763	1,188
Utah	38	40	40	22	27	30	81	85	85	1,782	2,295	2,550
Virginia	48	63	67	30	36	43	71	85	74	2,130	3,060	3,182
Washington	235	205	105	225	195	97	62	57	64	13,950	11,115	6,208
Wisconsin	40	43	45	23	30	25	57	54	59	1,311	1,620	1,475
Wyoming	62	90	80	53	75	64	85	92	105	4,505	6,900	6,720
US	**4,018**	**4,246**	**3567**	**3,502**	**3,779**	**3,113**	**60**	**63.6**	**73**	**210,110**	**210,110**	**227,323**

Source:
U.S. Department of Agriculture, *2010 Agricultural Statistics*, Table 1-56,
http://www.nass.usda.gov/Publications/Ag_Statistics/index.asp

[a] Includes area planted in the preceding fall.
[b] Preliminary
[c] Estimates discontinued in 2009

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Barley Production Costs and Returns per Planted Acre by Region, Excluding Government Payments, 2009-2010

(dollars per planted acre)

Item	United States 2009	United States 2010	Northern Great Plains 2009	Northern Great Plains 2010	Basin and Range 2009	Basin and Range 2010	Fruitful Rim 2009	Fruitful Rim 2010	Northern Crescent 2009	Northern Crescent 2010	Heartland 2009	Heartland 2010
Gross value of production												
Primary product: Barley grain	294.58	239.14	255.00	192.55	270.92	220.99	440.08	377.63	265.21	190.50	206.58	141.35
Secondary product: Barley silage, straw, grazing	11.94	11.98	5.59	5.12	11.56	10.59	16.53	15.13	75.62	69.24	18.57	17.01
Total, gross value of production	**306.52**	**251.12**	**260.59**	**197.67**	**282.48**	**231.58**	**456.61**	**392.76**	**340.83**	**259.74**	**225.15**	**158.36**
Operating costs:												
Seed	14.09	12.66	11.64	10.14	15.32	13.35	18.38	16.02	18.47	16.09	15.31	13.34
Fertilizer [b]	52.57	41.78	41.98	32.23	63.11	48.45	70.01	53.75	56.44	43.33	50.49	38.76
Chemicals	15.26	15.09	14.97	14.74	15.05	14.82	19.19	18.89	3.53	3.48	6.18	6.09
Custom operations[c]	9.36	9.78	7.11	7.11	8.32	8.32	13.79	13.79	18.50	18.50	15.14	15.14
Fuel, lube, and electricity	19.58	25.92	12.64	15.69	18.79	23.33	39.20	48.66	16.64	20.66	12.51	15.52
Repairs	18.41	19.00	17.20	17.53	18.67	19.03	23.16	23.61	11.75	11.98	11.64	11.86
Purchased irrigation water	3.07	3.50	0.90	0.91	4.60	4.65	7.60	7.69	2.69	2.72	0.74	0.75
Interest on operating inputs	0.19	0.13	0.15	0.10	0.21	0.13	0.28	0.18	0.19	0.12	0.16	0.10
Total, operating costs	**132.53**	**127.86**	**106.59**	**98.45**	**144.07**	**132.08**	**191.61**	**182.59**	**128.21**	**116.88**	**112.17**	**101.56**
Allocated overhead:												
Hired labor	4.06	4.43	2.35	2.37	3.31	3.35	9.48	9.58	2.58	2.61	2.57	2.60
Opportunity cost of unpaid labor	26.41	27.58	21.23	21.45	33.17	33.53	32.12	32.47	35.70	36.08	26.62	26.91
Capital recovery of machinery and equipment	95.74	98.77	93.45	95.97	95.99	98.58	110.59	113.58	62.97	64.67	62.16	63.84
Opportunity cost of land (rental rate)	80.64	88.28	52.03	53.58	101.98	105.00	135.42	139.44	77.30	79.59	84.37	86.87
Taxes and insurance	10.35	10.44	10.71	10.86	10.33	10.48	10.61	10.77	5.91	6.00	6.86	6.96
General farm overhead	10.47	10.81	9.78	9.97	10.34	10.54	12.66	12.90	9.73	9.92	8.84	9.01
Total, allocated overhead	**227.67**	**240.31**	**189.55**	**194.20**	**255.12**	**261.48**	**310.88**	**318.74**	**194.19**	**198.87**	**191.42**	**196.19**
Total, costs listed	**360.20**	**368.17**	**296.14**	**292.65**	**399.19**	**393.56**	**502.49**	**501.33**	**322.40**	**315.75**	**303.59**	**297.75**
Value of production less total costs listed	-53.68	-117.05	-35.55	-94.98	-116.71	-161.98	-45.88	-108.58	18.43	-56.01	-78.44	-139.39
Value of production less operating costs	173.99	123.26	154.00	99.22	138.41	99.50	265.00	210.17	212.62	142.86	112.98	56.80
Supporting information:												
Yield (bushels per planted acre)	62.41	61.16	60.00	56.30	52.10	54.70	81.80	79.50	51.10	50.80	39.20	38.10
Price (dollars per bushel at harvest)	4.72	3.91	4.25	3.42	5.20	4.04	5.38	4.75	5.19	3.75	5.27	3.71
Enterprise size (planted acres) [a]	219	219	342	342	194	194	266	266	33	33	87	87
Production practices: [a]												
Feed barley (percent of acres)	23	23	8	8	49	49	41	41	96	96	34	34
Malt barley (percent of acres)	77	77	92	92	51	51	59	59	-	-	66	66
Spring barley (percent of acres)	97	97	100	100	99	99	91	91	52	52	100	100
Winter barley (percent of acres)	-	-	0	0	-	-	9	9	47	47	0	0
Dryland (percent of acres)	80	80	94	94	70	70	38	38	98	98	100	100
Irrigated (percent of acres)	20	20	6	6	30	30	62	62	-	-	0	0
Straw harvested (percent of acres)	23	23	12	12	29	29	45	45	87	87	28	28

Source:
Economic Research Service, US Department of Agriculture,
http://www.ers.usda.gov/data/costsandreturns/testpick.htm

[a] Developed from survey base year, 2003.
[b] Cost of commercial fertilizers, soil conditioners, and manure.
[c] 0.1 to less than 5 percent.

Section: FEEDSTOCKS
Corn Baseline Projections, 2009 - 2020

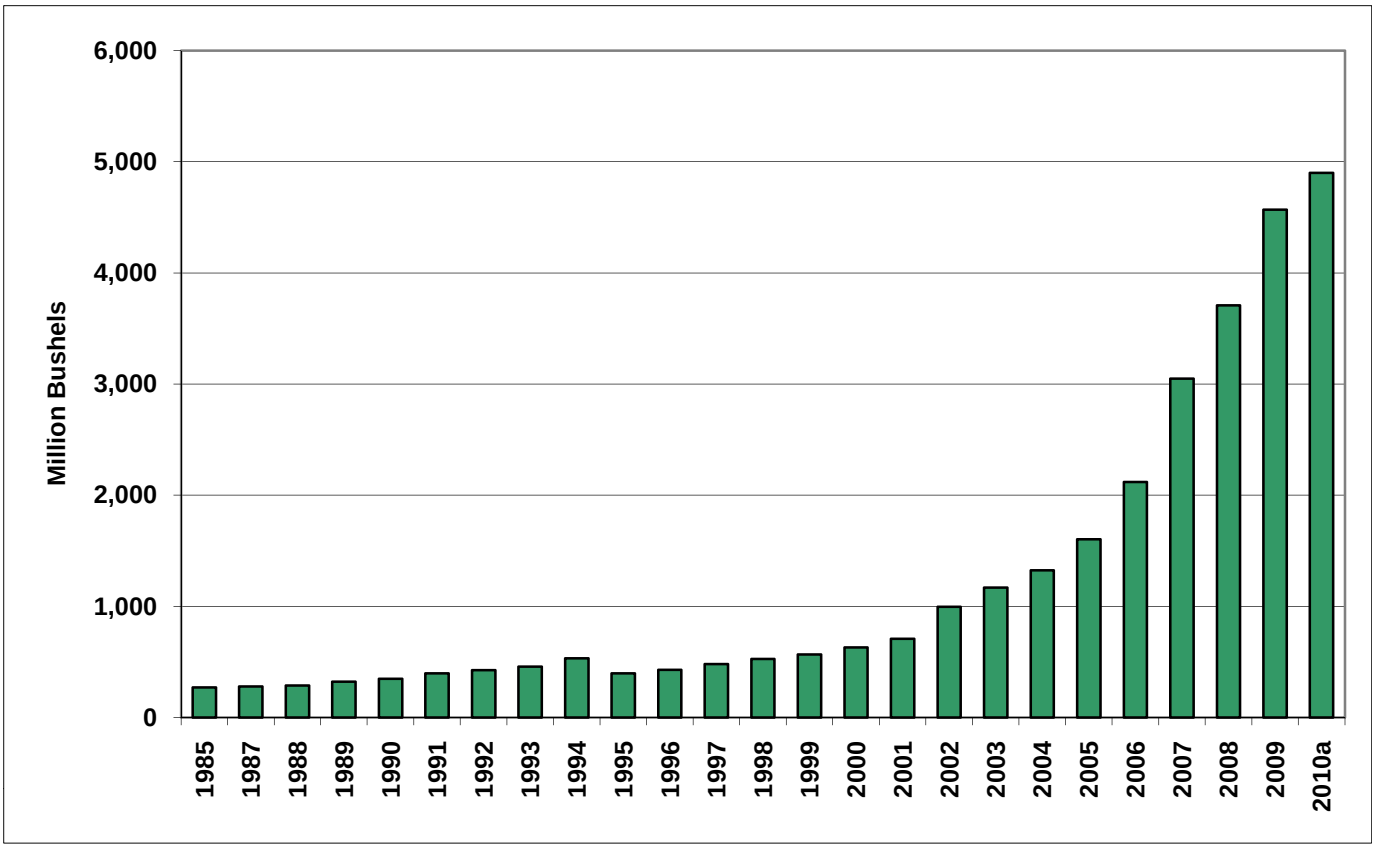
Item	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/2019	2019/2020	2020/2021
Area (million acres):												
Planted acres	86.5	88.2	92.0	91.5	91.0	90.5	90.5	90.5	91.0	91.5	92.0	92.0
Harvested acres	79.6	81.3	84.9	84.4	83.9	83.4	83.4	83.4	83.9	84.4	84.9	84.9
Yields (bushels per acre):												
Yield/harvested acre	164.7	154.3	162.0	164.0	166.0	168.0	170.0	172.0	174.0	176.0	178.0	180.0
Supply and use (million bushels):												
Beginning stocks	1,673	1,708	827	1,127	1,332	1,437	1,447	1,442	1,342	1,262	1,227	1,242
Production	13,110	12,540	13,755	13,840	13,925	14,010	14,180	14,345	14,600	14,855	15,110	15,280
Imports	8	10	10	10	10	10	10	10	10	10	10	10
Supply	14,792	14,257	14,592	14,977	15,267	15,457	15,637	15,797	15,952	16,127	16,347	16,532
Feed & residual	5,159	5,300	5,200	5,300	5,400	5,500	5,600	5,700	5,750	5,800	5,875	5,950
Food, seed, & industrial	5,938	6,180	6,265	6,320	6,380	6,435	6,495	6,605	6,740	6,850	6,930	6,990
Ethanol for fuel	4,568	4,800	4,875	4,925	4,975	5,025	5,075	5,175	5,300	5,400	5,475	5,525
Domestic	11,097	11,480	11,465	11,620	11,780	11,935	12,095	12,305	12,490	12,650	12,805	12,940
Exports	1,987	1,950	2,000	2,025	2,050	2,075	2,100	2,150	2,200	2,250	2,300	2,350
Total use	13,084	13,430	13,465	13,645	13,830	14,010	14,195	14,455	14,690	14,900	15,105	15,290
Ending stocks	1,708	827	1,127	1,332	1,437	1,447	1,442	1,342	1,262	1,227	1,242	1,242
Stocks/use ratio, percent	13.1	6.2	8.4	9.8	10.4	10.3	10.2	9.3	8.6	8.2	8.2	8.1
Prices (dollars per bushel):												
Farm price	3.55	5.20	4.80	4.30	4.10	4.10	4.10	4.15	4.20	4.25	4.25	4.25
Variable costs of production (dollars):												
Per acre	299	287	304	310	314	318	323	329	335	341	347	353
Per bushel	1.82	1.86	1.87	1.89	1.89	1.90	1.90	1.91	1.93	1.94	1.95	1.96
Returns over variable costs (dollars per acre):												
Net returns	286	515	474	395	367	370	374	384	396	407	410	412

Source:

USDA Long-Term Agricultural, Projection Tables to 2020 , February 2011, Table 19 - U.S. corn projections,
http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1192

The figure below shows that corn use for ethanol production has increased by almost seven fold from 2001 to 2010.

Section: FEEDSTOCKS
Corn Used for Ethanol Production, 1985-2010



Source: National Corn Growers Association, *The World of Corn,* 2011 and previous annual editions, http://www.ncga.com

Note: Based on Marketing Year September - August (i.e., 1985 data are from September 1985-August 1986)

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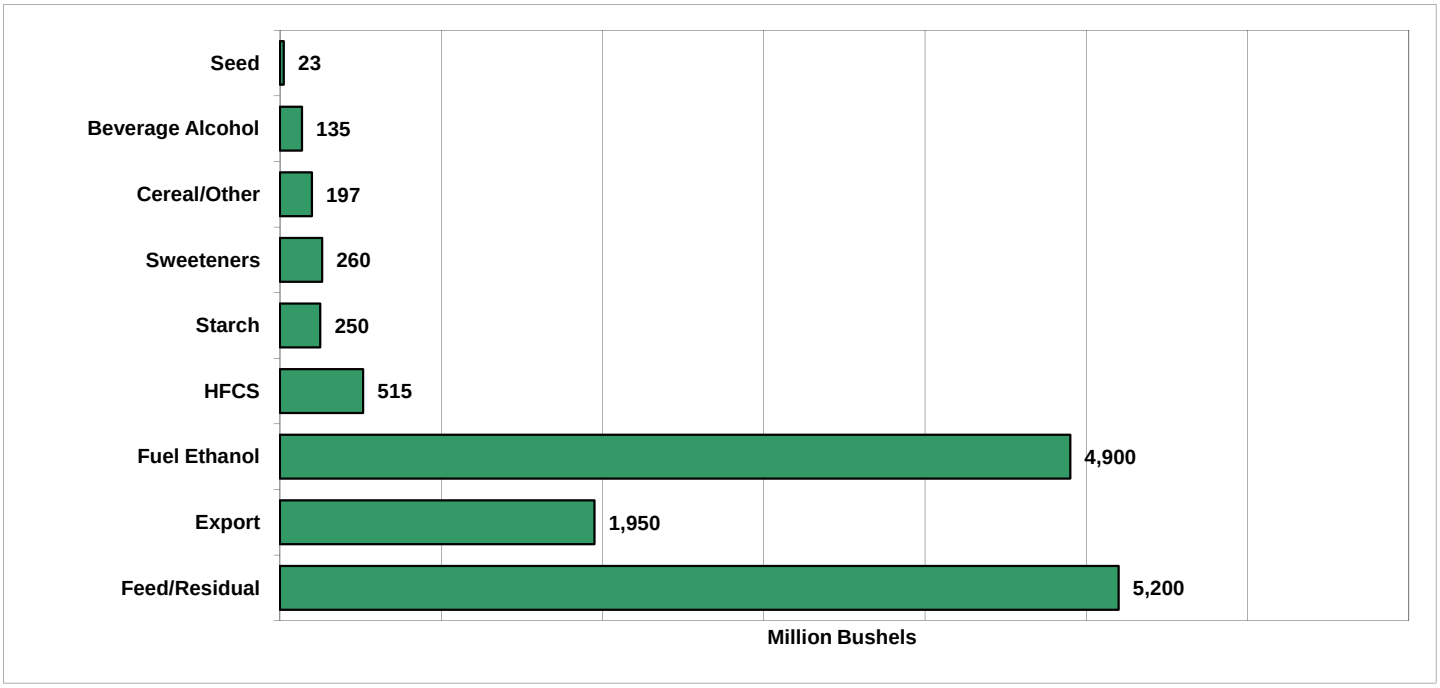
[a]Crop year ending 8/11. Includes approximately 102 billion bushels to be used as distillers grain for livestock feed.

In 2010, ethanol production accounted for about 36 percent of the overall corn consumption and more than double the amount used for export.

Section: FEEDSTOCKS
Corn Usage by Segment, 2010

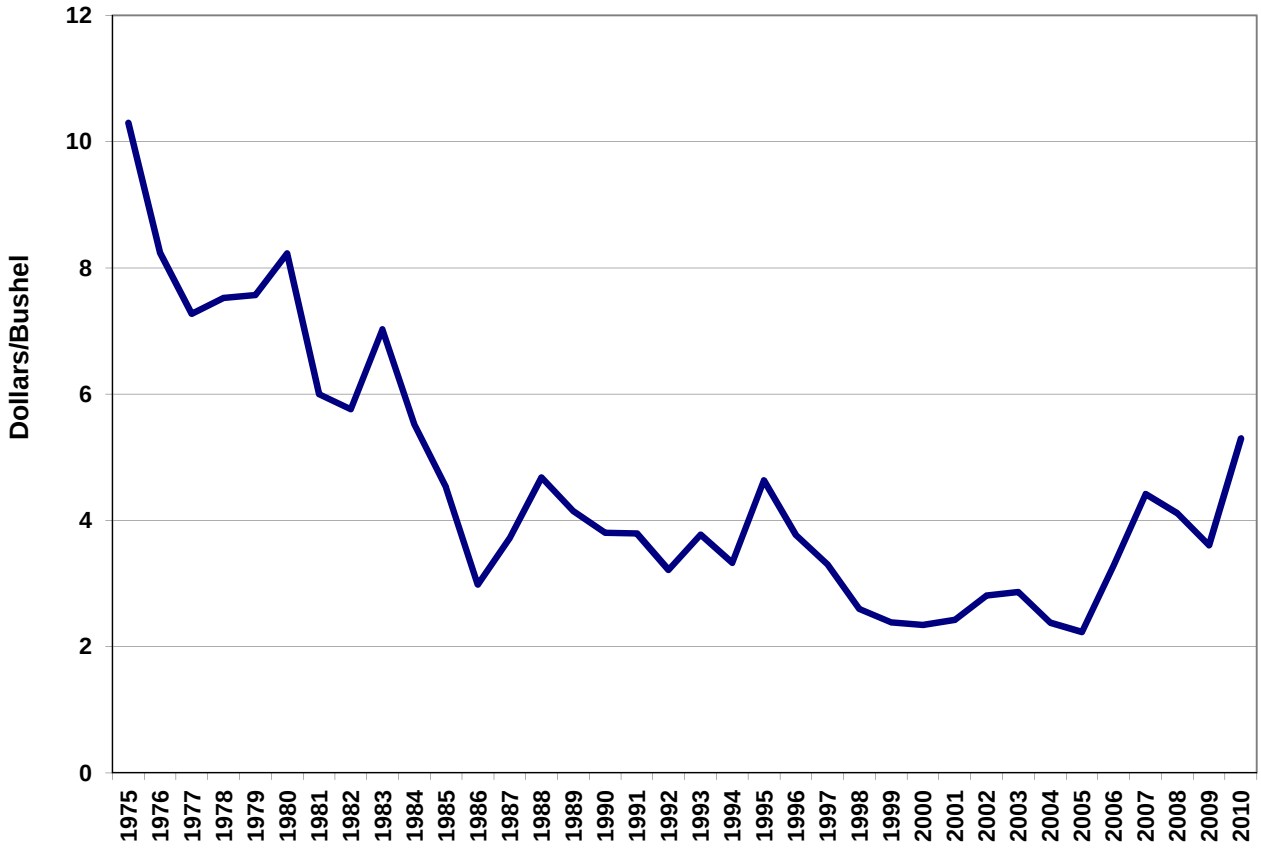


Source: National Corn Growers Association, *The World of Corn,* 2011
http://www.ncga.com/

Note: Crop year ending August 31, 2011.
HFCS - High Fructose Corn Syrup

Overall, the price for corn has been declining due to improvements in farming techniques. Though there has always been variation in corn price from year to year due to factors such as weather, affecting yield, much of the increase beginning in 2005 is likely attributable to increased demand for corn by ethanol producers.

Section: FEEDSTOCKS
Corn: Price per Bushel, 1975-2010



Source:
U.S. Department of Agriculture, National Agricultural Statistics Service
http://www.nass.usda.gov/

In the baseline year of 2001, 7.5% of all corn grain produced was used for ethanol production and by 2009 it rose to about 35%. Largely due to increased demand for ethanol, the acres of corn planted rose sharply in 2007 to 93 million acres but declined somewhat over the next two years; acreage variation is related to feed and export demands, crop subsidy programs, previous year grain prices and animal demand for silage. Yield variation relates to climate variation and improved varieties of corn.

Section: FEEDSTOCKS
Corn: Area, Yield, Production, and Value, 1996-2009

		Corn for grain					Corn for silage		
Year	**Area Planted for all purposes**	**Area harvested**	**Yield per harvested acre**	**Production**	**Marketing year average price per bushel**	**Value of production**	**Area Harvested**	**Yield per harvested acre**	**Production**
	1,000 Acres	1,000 Acres	Bushels	1,000 Bushels	Dollars	1,000 Dollars	1,000 Acres	Tons	1,000 Tons
1996	79,229	72,644	127.1	9,232,557	2.71	25,149,013	5,607	15.4	86,581
1997	79,537	72,671	126.7	9,206,832	2.43	22,351,507	6,054	16.1	97,192
1998	80,165	72,589	134.4	9,758,685	1.94	18,922,084	5,913	16.1	95,479
1999	77,386	70,487	133.8	9,430,612	1.82	17,103,991	6,037	15.8	95,633
2000	79,551	72,440	136.9	9,915,051	1.85	18,499,002	6,082	16.8	102,156
2001	75,702	68,768	138.2	9,502,580	1.97	18,878,819	6,142	16.6	101,992
2002	78,894	69,330	129.3	8,966,787	2.32	20,882,448	7,122	14.4	102,293
2003	78,603	70,944	142.2	10,087,292	2.42	24,472,254	6,583	16.3	107,378
2004	80,929	73,631	160.3	11,805,581	2.06	24,377,913	6,101	17.6	107,293
2005	81,779	75,117	147.9	11,112,187	2.00	22,194,287	5,930	18.0	106,486
2006	78,327	70,638	149.1	10,531,123	3.04	32,083,011	6,487	16.2	105,129
2007	93,527	86,520	150.7	13,073,875	4.20	54,666,959	6,060	17.5	106,229
2008	85,982	78,570	153.9	12,091,648	4.06	49,312,615	5,965	18.7	111,619
2009[a]	86,482	79,590	164.7	13,110,062	3.70	48,588,665	5,605	19.3	108,209

Source: U.S. Department of Agriculture, *2010 Agricultural Statistics* , Table 1-35 and previous annual editions.
http://www.nass.usda.gov/Publications/Ag_Statistics/index.asp

[a] Preliminary

Production of sufficient quantities of corn to support ethanol production facilities occurs primarily in the mid-western states. Yields vary considerably across the states. High yields in the western states occur under irrigation.

Section: FEEDSTOCKS
Corn: Area, Yield, and Production, by State, 2007-2009

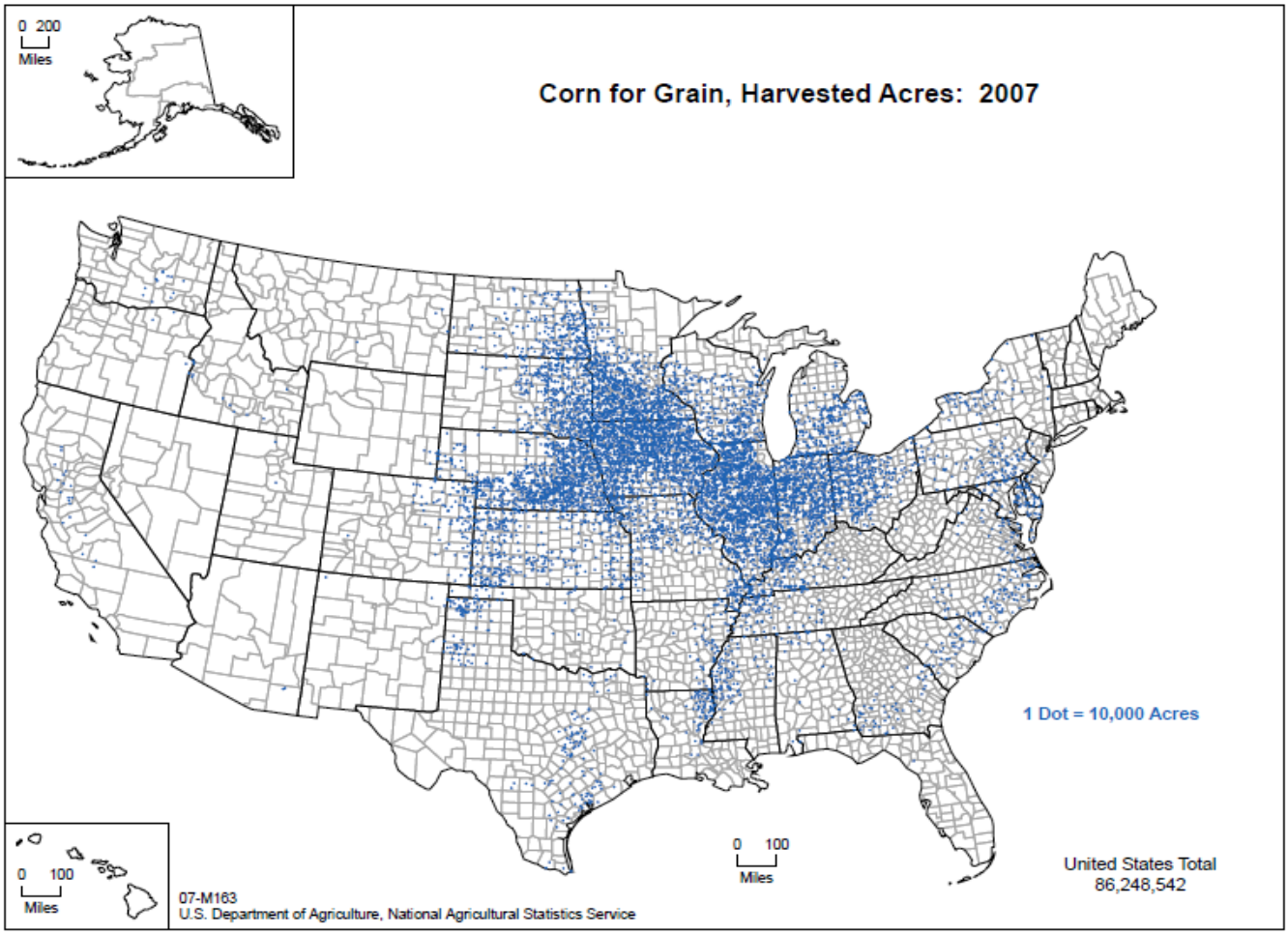
State	Area planted for all purposes			Corn for grain								
				Area harvested			Yield per harvested acre			Production		
	2007	2008	2009[a]	2007	2008	2009[a]	2007	2008	2009[a]	2007	2008	2009[a]
	1,000 Acres	1,000 Acres	1,000 Acres	1,000 Acres	1,000 Acres	1,000 Acres	Bushels	Bushels	Bushels	1,000 Bushels	1,000 Bushels	1,000 Bushels
Alabama	340	260	280	280	235	250	78	104	108	21,840	24,440	27,000
Arizona	55	50	50	22	15	20	185	165	175	4,070	2,475	3,500
Arkansas	610	440	430	590	430	410	169	155	148	99,710	66,650	60,680
California	650	670	550	190	170	160	182	195	180	34,580	33,150	28,800
Colorado	1,200	1,250	1,100	1,060	1,010	990	140	137	153	148,400	138,370	151,470
Connecticut	26	27	26	b	b	b	b	b	b	b	b	b
Delaware	195	160	170	185	152	163	99	125	145	18,315	19,000	23,635
Florida	70	70	70	35	35	37	90	105	100	3,150	3,675	3,700
Georgia	510	370	420	450	310	370	127	140	140	57,150	43,400	51,800
Idaho	320	300	300	105	80	80	170	170	180	17,850	13,600	14,400
Illinois	13,200	12,100	12,000	13,050	11,900	11,800	175	179	174	2,283,750	2,130,100	2,053,200
Indiana	6,500	5,700	5,600	6,370	5,460	5,460	154	160	171	980,980	873,600	933,660
Iowa	14,200	13,300	13,700	13,900	12,800	13,400	171	171	182	2,376,900	2,188,800	2,438,800
Kansas	3,900	3,850	4,100	3,680	3,630	3,860	138	134	155	507,840	486,420	598,300
Kentucky	1,440	1,210	1,220	1,340	1,120	1,150	128	136	165	171,520	152,320	189,750
Louisiana	740	520	630	730	510	610	163	144	132	118,990	73,440	80,520
Maine	28	29	28	b	b	b	b	b	b	b	b	b
Maryland	540	460	470	465	400	425	101	121	145	46,965	48,400	61,625
Massachusetts	18	19	17	b	b	b	b	b	b	b	b	b
Michigan	2,650	2,400	2,350	2,340	2,140	2,070	123	138	148	287,820	295,320	309,320
Minnesota	8,400	7,700	7,600	7,850	7,200	7,150	146	164	174	1,146,100	1,180,800	1,244,100
Mississippi	930	720	730	910	700	695	148	140	126	134,680	98,000	87,570
Missouri	3,450	2,800	3,000	3,270	2,650	2,920	140	144	153	457,800	381,600	446,760
Montana	84	78	72	38	35	26	140	136	152	5,320	4,760	3,952
Nebraska	9,400	8,800	9,150	9,200	8,550	8,850	160	163	178	1,472,000	1,393,650	1,575,300
Nevada	5	5	4	b	b	b	b	b	b	b	b	b
New Hampshire	14	15	15	b	b	b	b	b	b	b	b	b
New Jersey	95	85	80	82	74	70	124	116	143	10,168	8,540	10,010
New Mexico	135	140	130	54	55	50	180	180	185	9,720	9,900	9,250
New York	1060	1,090	1,070	550	640	595	128	144	134	70,400	92,160	79,730
North Carolina	1090	900	870	1,010	830	800	100	78	117	101,000	64,740	93,600
North Dakota	2,560	2,550	1,950	2,350	2,300	1,740	116	124	115	272,600	285,200	200,100
Ohio	3,850	3,300	3,350	3,610	3,120	3,140	150	135	174	541,500	421,200	546,360
Oklahoma	320	370	390	270	320	320	145	115	105	39,150	36,800	33,600
Oregon	60	60	60	35	33	32	200	200	215	7,000	6,600	6,880
Pennsylvania	1,430	1,350	1,350	980	880	920	124	133	143	121,520	117,040	131,560
Rhode Island	2	2	2	b	b	b	b	b	b	b	b	b
South Carolina	400	355	335	370	315	320	97	65	111	35,890	20,475	35,520
South Dakota	4,950	4,750	5,000	4,480	4,400	4,680	121	133	151	542,080	585,200	706,680
Tennessee	860	690	670	790	630	590	106	118	148	83,740	74,340	87,320
Texas	2,150	2,300	2,350	1,970	2,030	1,960	148	125	130	291,560	253,750	254,800
Utah	70	70	65	22	23	17	150	157	155	3,300	3,611	2,635
Vermont	92	94	91	b	b	b	b	b	b	b	b	b
Virginia	540	470	480	405	340	330	86	108	131	34,830	36,720	43,230
Washington	195	165	170	115	90	105	210	205	215	24,150	18,450	22,575
West Virginia	48	43	47	27	26	30	111	130	126	2,997	3,380	3,780
Wisconsin	4,050	3,800	3,850	3,280	2,880	2,930	135	137	153	442,800	394,560	448,290
Wyoming	95	95	90	60	52	45	129	134	140	7,740	6,968	6,300
US	**93,527**	**85,982**	**86,482**	**86,520**	**78,570**	**795,920**	**150.7**	**153.9**	**164.7**	**13,037,875**	**12,091,648**	**13,110,062**

Source:
U.S. Department of Agriculture, *2010 Agricultural Statistics* , Table 1-37,
http://www.nass.usda.gov/Publications/Ag_Statistics/index.asp

[a] Preliminary.
[b] Not estimated.

The large majority of U.S. corn grain is produced in just a few mid-western states. The highest concentration of corn production is found in central Illinois, northern Iowa/southern Minnesota, and eastern Nebraska.

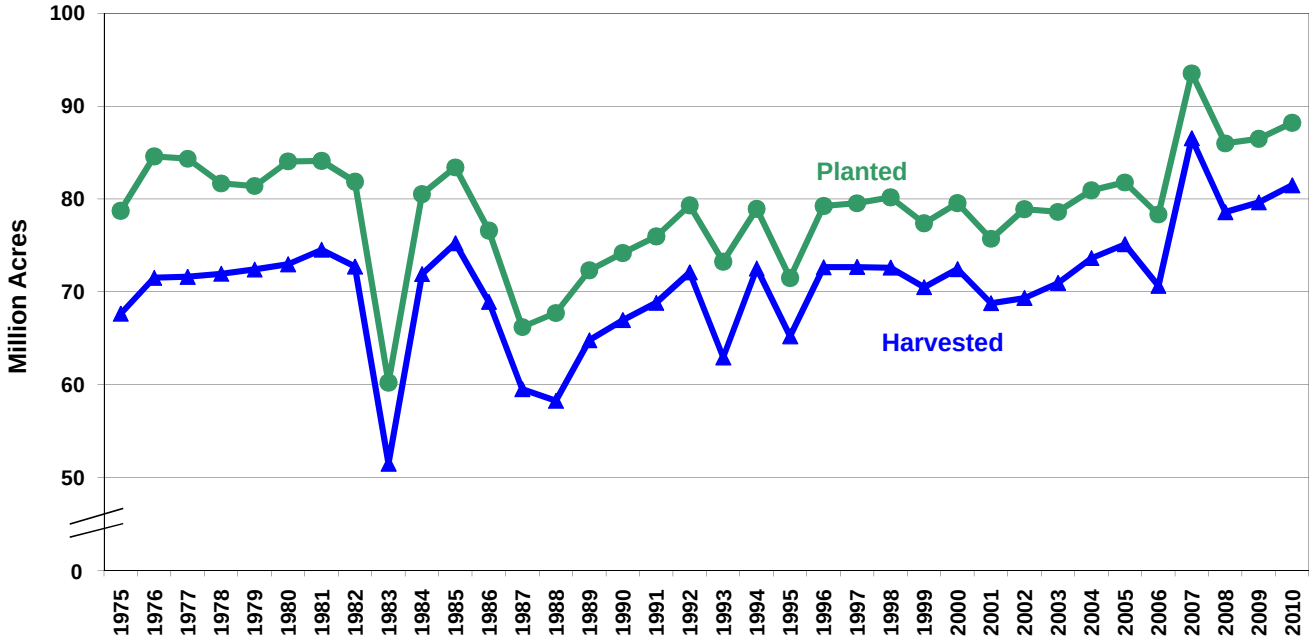
Section: FEEDSTOCKS
Corn for Grain, Harvested Acres, 2007



Source: U.S. Department of Agriculture, National Agricultural Statistics Service, The Census of Agriculture
http://www.agcensus.usda.gov/Publications/2007/Online_Highlights/Ag_Atlas_Maps/Crops_and_Plants/

Due largely to increased ethanol demand, there was a remarkable increase in the number of corn acres planted in 2007. Acres harvested for grain are always less than planted acres due to silage and crop failure.

Section: FEEDSTOCKS
Corn Acres Planted and Harvested, 1975-2010



Source:
U.S. Department of Agriculture, National Agricultural Statistics Service
http://www.nass.usda.gov/

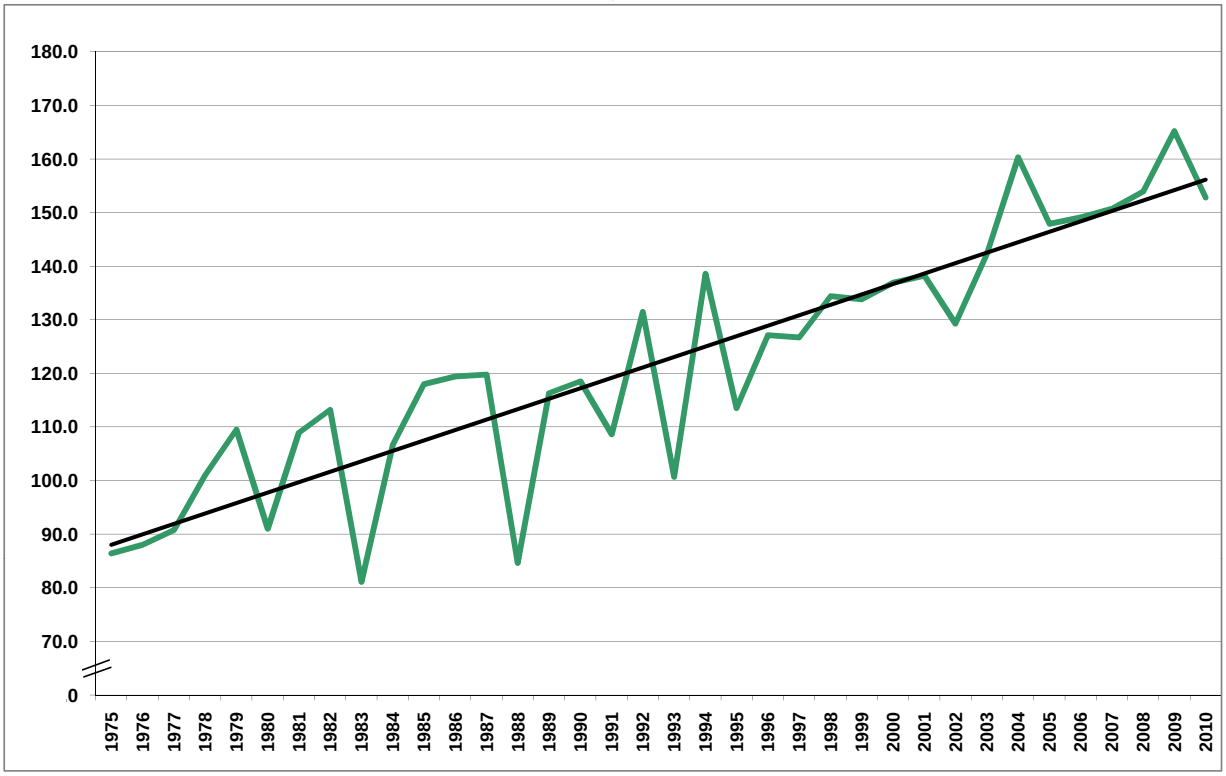
Doberman et. al., noted in 2002 that average corn yields have increased linearly at a rate of 1.7 bushels per acre (bu/ac) per year. At present that translates to a rate of 1.1% per year, but if the same average linear rate continues, the percentage rate will decline. Corn yields must continue to increase at a rate of at least 1% per year to meet the demands created by expected population growth.

In 2002 average corn yields approached 140 bu/ac with progressive farmers routinely harvesting 160 to 220 bu/ac. Yields rose in the 60's and 70's largely due to increasing application of fertilizer to responsive corn hybrids; however, after 1980 yield increases were maintained without continued fertilizer increases due to significant increases in nutrient use efficiency. In the past 15 years, yields have continued to increase due to improved hybrids with greater stress resistance together with improved crop management techniques such as conservation tillage, higher plant densities and improved seed qualities.

Yields at a given site fluctuate as much as 10-15% from year to year due to normal variations in solar radiation and temperature regimes assuming suitable moisture levels. Lack of sufficient moisture is the most important factor reducing yields in most of the U.S. corn belt where most corn is not irrigated. The yield potential of corn continues to be much greater than the average yields currently being obtained in most locations in the U.S.

Genetic improvements (particularly in drought resistance) are expected to continue to contribute to yield increases, but continued improvements in crop management will be ever more important. Key references on yield potential follow.

Section: FEEDSTOCKS
Corn Yield, 1975-2010



Source:
U.S. Department of Agriculture, National Agricultural Statistics Service
http://www.nass.usda.gov/

Additional References:

Dobermann, A., T. Arkebauer, K. Cassman, J. Lindquist, J. Specht, D. Walters, and H. Yang. 2002. *Understanding and Managing Corn Yield Potential. Proceedings of the Fertilizer Industry Round Table* , Charleston, South Carolina. The Fertilizer Industry Round Table, Forest Hill, Maryland, October.

Dobermann, A., T. Arkebauer, K.G. Cassman, R.A. Drijber, J.L. Lindquist, J.E. Specht, D.T. Walters, H. Yang, D. Miller, D.L. Binder, G. Teichmeier, R.B. Ferguson, and C.S. Wortmann. 2003. Understanding corn yield potential in different environments. p. 67-82. In L.S. Murphy (ed.) Fluid focus: the third decade. Proceedings of the 2003 Fluid Forum, Vol. 20. Fluid Fertilizer Foundation, Manhattan, KS.

Both Doberman, et. al references can be obtained at the following url:
http://soilfertility.unl.edu/Materials%20to%20include/Research%20Pubs/Ecological%20Intensification.htm

Tollenaar, M. and E. A. Lee. Yield potential, yield stability, and stress tolerance in maize. *Field Crops Research* 75 (2002):161-169.

Duvick, D.N. and K.G. Cassman. 1999. Post-green revolution trends in yield potential of temperature maize in the North-Central United States. Crop Science. 39:1622-1630.

Production of food for domestic livestock is the largest single use of corn grain, accounting for nearly half of all corn grain produced. Ethanol production is included in the food, seed and industrial category.

Section: FEEDSTOCKS
Corn: Supply and Disappearance, 1996-2010
(million bushels)

	Supply				Disappearance					Ending stocks August 31		
					Domestic use							
Year (beginning September 1)	**Beginning stocks**	**Production**	**Imports**	**Total**	**Feed and residual**	**Food, seed, and industrial**	**Total**	**Exports**	**Total disappear-ance**	**Privately held [a]**	**Govern - ment**	**Total**
1996	426	9,233	13	9,672	5,277	1,714	6,991	1,797	8,789	881	2	883
1997	883	9,207	9	10,099	5,482	1,805	7,287	1,504	8,791	1,304	4	1,308
1998	1,308	9,759	19	11,085	5,471	1,846	7,317	1,984	9,298	1,775	12	1,787
1999	1,787	9,431	15	11,232	5,664	1,913	7,578	1,937	9,515	1,704	14	1,718
2000	1,718	9,915	7	11,639	5,842	1,957	7,799	1,941	9,740	1,891	8	1,899
2001	1,899	9,503	10	11,412	5,864	2,046	7,911	1,905	9,815	1,590	6	1,596
2002	1,596	8,967	14	10,578	5,563	2,340	7,903	1,588	9,491	1,083	4	1,087
2003	1,087	10,089	14	11,190	5,795	2,537	8,332	1,900	10,232	958	0	958
2004	958	11,806	11	12,775	6,155	2,687	8,842	1,818	10,661	2,113	1	2,114
2005	2,114	11,112	9	13,235	6,152	2,982	9,134	2,134	11,268	1,967	0	1,967
2006	1,967	10,531	12	12,510	5,591	3,490	9,081	2,125	11,207	1,304	0	1,304
2007	1,304	13,038	20	14,362	5,858	4,442	10,300	2,437	12,737	1,624	0	1,624
2008	1,624	12,092	14	13,729	5,182	5,025	10,207	1,849	12,056	1,673	0	1,673
2009 [b]	1,673	13,110	8	14,791	5,525	5,900	11,425	1,980	13,405	1,386	0	1,386
2010 [c]	1,386	13,160	10	14,556	5,250	6,090	11,340	2,100	13,440	1,116	0	1,116

Source:
U.S. Department of Agriculture, *2010 Agricultural Statistics* , Table 1-38,
http://www.nass.usda.gov/Publications/Ag_Statistics/index.asp

[a] Includes quantity under loan and farmer-owned reserve.
[b] Preliminary.
[c] Projected as of January 11, 2010, World Agricultural Supply and Demand Estimates. Totals may not add due to rounding.

Prices of corn used for ethanol production may vary for each mill depending on whether the mills are owned by farmers' cooperatives or whether the corn is purchased on the open market. Prices vary across states considerably.

Section: FEEDSTOCKS
Corn for Grain: Marketing Year Average Price and Value, by State, Crops of 2007, 2008, and 2009

State	Marketing year average price per bushel			Value of production		
	2007	2008	2009[a]	2007	2008	2009[a]
	Dollars	Dollars	Dollars	1,000 Dollars	1,000 Dollars	1,000 Dollars
Alabama	4.54	5.26	4.15	99,154	128,554	112,050
Arizona	5.03	5.80	4.00	20,472	14,355	14,000
Arkansas	3.80	4.42	3.75	378,898	294,593	227,550
California	4.28	4.77	4.35	148,002	158,126	125,280
Colorado	3.96	4.14	3.85	587,664	572,852	583,160
Delaware	4.76	4.57	3.80	87,179	86,830	89,813
Florida	4.00	4.50	4.00	12,600	16,538	14,800
Georgia	4.50	4.50	3.60	257,175	195,300	186,480
Idaho	4.96	4.32	4.25	88,536	58,752	61,200
Illinois	4.09	4.01	3.65	9,340,538	8,541,701	7,537,250
Indiana	4.39	4.10	3.75	4,306,502	3,581,760	3,501,225
Iowa	4.29	4.10	3.75	10,196,901	8,974,080	9,145,500
Kansas	4.13	4.12	3.60	2,097,379	54,880	2,153,880
Kentucky	4.14	4.36	3.75	710,093	664,115	711,563
Louisiana	3.80	4.45	3.55	452,162	326,808	285,846
Maryland	4.64	4.42	4.00	217,918	213,928	246,500
Michigan	4.37	3.84	3.60	1,257,773	1,134,029	1,118,880
Minnesota	4.13	3.92	3.70	4,733,393	4,628,736	4,629,625
Mississippi	3.68	4.63	3.70	495,622	453,740	324,009
Missouri	4.17	4.11	3.65	1,909,026	1,568,376	1,630,674
Montana	4.76	3.80	4.15	25,323	18,088	16,401
Nebraska	4.14	4.05	3.70	6,094,080	5,644,283	5,828,610
New Jersey	4.65	4.15	3.40	47,281	35,624	34,034
New Mexico	5.20	5.30	4.00	50,544	52,470	37,000
New York	5.05	4.32	3.95	355,520	398,131	314,934
North Carolina	4.00	4.91	3.85	404,000	317,873	360,360
North Dakota	4.06	3.74	3.40	1,106,756	1,066,648	708,050
Ohio	4.29	4.21	3.70	2,323,035	1,773,252	2,021,532
Oklahoma	4.07	4.46	3.80	159,341	164,128	127,680
Oregon	4.36	4.15	4.10	30,520	27,390	28,208
Pennsylvania	4.56	4.16	3.85	554,131	486,886	506,506
South Carolina	3.88	4.59	3.85	139,253	93,980	136,752
South Dakota	4.17	3.78	3.40	2,260,474	2,212,056	2,444,940
Tennessee	3.80	4.53	3.65	318,212	336,760	318,718
Texas	4.35	4.82	4.05	1,268,286	1,223,075	1,031,940
Utah	4.18	4.40	4.35	13,794	15,888	11,462
Virginia	4.39	4.51	3.75	152,904	165,607	162,113
Washington	4.50	4.56	4.50	108,675	84,132	101,588
West Virginia	4.60	4.34	3.55	13,786	14,669	13,419
Wisconsin	4.11	3.89	3.70	1,819,908	1,534,838	1,658,673
Wyoming	3.12	4.25	4.20	24,149	29,614	26,460
US	**4.20**	**4.06**	**3.70**	**54,666,959**	**54,666,959**	**48,588,665**

Source: U.S. Department of Agriculture, *2010 Agricultural Statistics,* Table 1-40, http://www.nass.usda.gov/Publications/Ag_Statistics/index.asp

[a] Preliminary

These data show that government subsidies are vital to ensuring a profit to farmers, when land and labor opportunity costs are considered. However, many farmers only factor operating costs into the calculation, making corn the most profitable commodity crop in most regions of the country. If the residue from corn production also had a market as a bioenergy feedstock, then farmers in areas of high corn yield may come closer to making a profit without subsidies.

Section: FEEDSTOCKS
Corn Production Costs and Returns per Planted Acre by Region, Excluding Government Payments, 2009-2010[a]
(dollars per planted acre)

	United States		Heartland		Northern Crescent		Northern Great Planes		Prairie Gateway		Eastern Uplands		Southern Seaboard	
Item	**2009**	**2010**	**2009**	**2010**	**2009**	**2010**	**2009**	**2010**	**2009**	**2010**	**2009**	**2010**	**2009**	**2010**
Gross value of production														
Primary product: Corn grain	560.04	636.55	606.48	676.06	441.25	561.96	474.02	569.9	532.14	598.69	560.04	526.68	433.92	499.55
Secondary product: Corn silage	1.18	1.13	0.70	0.68	3.02	2.59	4.58	3.92	2.47	2.18	5.73	5.41	0.00	0.00
Total, gross value of production	**561.22**	**637.68**	**607.18**	**676.74**	**444.27**	**564.55**	**478.60**	**573.82**	**534.61**	**600.87**	**565.77**	**532.09**	**433.92**	**499.55**
Operating costs:														
Seed	78.92	66.15	80.61	67.61	80.61	67.61	76.91	64.51	71.04	59.58	73.52	61.66	71.43	59.91
Fertilizer [b]	132.72	100.30	139.58	105.82	150.49	114.09	88.83	67.35	92.00	69.75	168.93	128.07	141.26	107.10
Chemicals	27.68	27.39	30.35	30.08	24.49	24.27	19.42	19.25	22.88	22.67	27.34	27.09	26.38	26.14
Custom operations[c]	11.98	12.15	10.67	10.80	14.80	14.99	10.88	11.02	16.05	16.25	10.53	10.66	7.68	7.78
Fuel, lube, and electricity	29.00	35.73	22.04	26.79	27.84	34.62	28.10	35.01	66.77	81.47	19.63	22.73	24.13	28.89
Repairs	15.69	16.03	13.72	13.98	15.80	16.10	17.10	17.43	23.90	24.36	13.29	13.54	22.72	23.15
Purchased irrigation water	0.14	0.15	0.00	0.00	0.02	0.02	1.79	1.81	0.21	0.21	0.00	0.00	0.00	0.00
Interest on operating capital	0.43	0.26	0.43	0.26	0.46	0.27	0.35	0.22	0.42	0.27	0.45	0.26	0.43	0.25
Total, operating costs	**296.56**	**258.16**	**297.40**	**255.34**	**314.51**	**271.97**	**243.38**	**216.60**	**293.27**	**274.56**	**313.69**	**264.01**	**294.03**	**253.22**
Allocated overhead:														
Hired labor	2.41	2.44	1.59	1.61	3.43	3.47	3.74	3.78	4.01	4.05	1.32	1.33	6.92	6.99
Opportunity cost of unpaid labor	25.67	25.92	22.44	22.68	36.03	36.42	24.12	24.38	26.54	26.82	42.77	43.23	27.99	28.29
Capital recovery of machinery and equipmen	81.11	83.46	77.56	79.66	77.68	79.78	88.63	91.03	100.23	102.94	72.91	74.88	81.64	83.85
Opportunity cost of land (rental rate)	123.90	127.33	142.36	146.58	104.74	107.85	81.17	83.58	89.77	92.43	85.21	87.74	74.25	76.45
Taxes and insurance	8.13	8.23	7.46	7.57	11.08	11.24	5.00	5.07	9.13	9.26	6.32	6.41	9.69	9.83
General farm overhead	14.49	14.71	13.61	13.87	19.81	20.19	10.32	10.52	13.70	13.96	11.83	12.06	18.89	19.25
Total, allocated overhead	**255.71**	**262.09**	**265.02**	**271.97**	**252.77**	**258.95**	**212.98**	**218.36**	**243.38**	**249.46**	**220.36**	**225.65**	**219.38**	**224.66**
Total, costs listed	**552.27**	**520.25**	**562.42**	**527.31**	**567.28**	**530.92**	**456.36**	**434.96**	**536.65**	**524.02**	**534.05**	**489.66**	**513.41**	**477.88**
Value of production less total costs listed	8.95	117.43	44.76	149.43	-123.01	33.63	22.24	138.86	-2.04	76.85	31.72	42.43	-79.49	21.67
Value of production less operating costs	264.66	379.52	309.78	421.40	129.76	292.58	235.22	357.22	241.34	326.31	252.08	268.08	139.89	246.33
Supporting information:														
Yield (bushels per planted acre)	156	145	168	154	125	126	137	139	147	137	156	114	113	97
Price (dollars per bushel at harvest)	3.59	4.39	3.61	4.39	3.53	4.46	3.46	4.10	3.62	4.37	3.59	4.62	3.84	5.15
Enterprise size (planted acres) [a]	250	250	281	281	128	128	341	341	322	322	77	77	146	146
Production practices: [a]														
Irrigated (percent)	12	12	5	5	5	5	21	21	48	48	2	2	13	13
Dryland (percent)	88	88	95	95	95	95	79	79	52	52	98	98	87	87

Source:
Economic Research Service, US Department of Agriculture,
http://www.ers.usda.gov/data/costsandreturns/testpick.htm

[a] Developed from survey base year, 2005.
[b] Cost of commercial fertilizers, soil conditioners, and manure.
[c] Cost of custom operations, technical services, and commercial drying.

Section: FEEDSTOCKS
Oats: Area, Yield, Production, and Value, 1996-2009

Year	Area		Yield per harvested acre	Production	Marketing year average price per bushel received by farmers	Value of production
	Planted[a]	Harvested				
	1,000 Acres	1,000 Acres	Bushels	1,000 Bushels	Dollars	1,000 Dollars
1996	4,638	2,655	57.7	153,245	1.96	313,910
1997	5,068	2,813	59.5	167,246	1.60	273,284
1998	4,891	2,752	60.2	165,768	1.10	199,475
1999	4,668	2,445	59.6	145,628	1.12	174,307
2000	4,473	2,325	64.2	149,165	1.10	175,432
2001	4,401	1,911	61.5	117,602	1.59	197,181
2002	4,995	2,058	56.4	116,002	1.81	212,078
2003	4,597	2,220	65.0	144,383	1.48	224,910
2004	4,085	1,787	64.7	115,695	1.48	178,327
2005	4,246	1,823	63.0	114,859	1.63	195,166
2006	4,166	1,564	59.8	93,522	1.87	180,899
2007	3,763	1,504	60.1	90,430	2.63	247,644
2008	3,247	1,400	63.7	89,135	3.15	269,763
2009 [b]	3,404	1,379	67.5	93,081	2.10	216,566

Source: U.S. Department of Agriculture, *2010 Agricultural Statistics*, Table 1-45 and annual.
http://www.nass.usda.gov/Publications/Ag_Statistics/index.asp

[a] Oats sown for all purposes, including oats sown in the preceding fall.
[b] Preliminary

Section: FEEDSTOCKS
Oats: Area, Yield, and Production, by State, 2007-2009

	Area planted[a]			Area harvested			Yield per harvested acre			Production		
	2007	2008	2009	2007	2008	2009	2007	2008	2009	2007	2008	2009
	1,000 Acres	1,000 Acres	1,000 Acres	1,000 Acres	1,000 Acres	1,000 Acres	Bushels	Bushels	Bushels	1,000 Bushels	1,000 Bushels	1,000 Bushels
Alabama	45	50	50	16	15	11	58	50	50	928	750	550
Arkansas[b]	***	***	10	***	***	8	***	***	80	***	***	640
California	215	260	250	25	20	30	99	80	105	2,475	2,000	3,150
Colorado	75	45	60	10	7	9	55	70	65	550	490	585
Georgia	70	65	60	30	25	20	56	69	56	1,680	1,725	1,120
Idaho	70	70	80	20	20	25	61	69	78	1,220	1,380	1,950
Illinois	35	45	40	24	30	25	62	70	65	1,488	2,100	1,625
Indiana	25	15	15	8	5	7	53	75	69	424	375	483
Iowa	145	150	200	67	75	95	71	65	65	4,757	4,875	6,175
Kansas	90	60	85	35	25	35	45	53	53	1,575	1,325	1,855
Maine	29	32	32	28	31	31	70	65	65	1,960	2,015	2,015
Michigan	70	75	70	55	60	55	56	66	63	3,080	3,960	3,465
Minnesota	270	250	250	180	175	170	60	68	71	10,800	11,900	12,070
Missouri	25	15	15	8	6	9	50	55	55	400	330	495
Montana	75	60	70	35	30	32	50	51	56	1,750	1,530	1,792
Nebraska	120	95	100	35	35	30	61	70	69	2,135	2,450	2,070
New York	100	80	90	60	64	60	58	66	77	3,480	4,224	4,620
North Carolina	50	60	50	15	30	15	55	80	70	825	2,400	1,050
North Dakota	460	320	350	260	130	165	59	51	68	15,340	6,630	11,220
Ohio	75	75	65	50	50	45	62	70	75	3,100	3,500	3,375
Oklahoma	80	50	50	15	10	15	31	40	34	465	400	510
Oregon	60	45	45	18	18	22	78	100	100	1,404	1,800	2,200
Pennsylvania	115	105	110	80	80	80	56	58	61	4,480	4,640	4,880
South Carolina	33	33	30	14	19	15	42	64	55	588	1,216	825
South Dakota	330	220	200	130	120	90	72	73	73	9,360	8,760	6,570
Texas	710	600	600	100	100	60	40	50	47	4,000	5,000	2,820
Utah	35	40	45	4	4	5	80	75	81	320	300	405
Virginia	16	12	12	5	4	4	60	70	54	300	280	216
Washington	30	20	20	9	5	6	50	80	80	450	400	480
Wisconsin	270	270	310	160	190	195	67	62	68	10,720	11,780	13,260
Wyoming	40	30	40	8	12	10	47	50	61	376	600	610
US	**3,763**	**3,247**	**3,404**	**1,504**	**1,400**	**1,379**	**60.1**	**63.7**	**67.5**	**90,430**	**89,135**	**93,081**

Source:
U.S. Department of Agriculture, *2010 Agricultural Statistics*, Table 1-49,
http://www.nass.usda.gov/Publications/Ag_Statistics/index.asp

[a] Relates to the total area of oats sown for all purposes, including oats sown in the preceding fall.
[b] Estimates began in 2009.

Section: FEEDSTOCKS

Oats Production Costs and Returns per Planted Acre by Region, Excluding Government Payments, 2009-2010[a]

(dollars per planted acre)

Item	United States		Northern Great Plains		Prarie Gateway		Northern Crescent		Heartland	
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
Gross value of production										
Primary product: Oats	155.35	130.168	131.88	114.82	91.133	75.336	154.752	132.912	128.212	103.6
Secondary product: Straw	59.35	46.47	29.50	23.42	6.53	5.70	77.41	58.74	76.81	62.34
Secondary product: Hay, silage, grazing	21.05	15.77	19.10	14.57	64.03	42.09	16.88	13.23	14.92	10.32
Total, gross value of production	**235.75**	**192.41**	**180.48**	**152.81**	**161.69**	**123.13**	**249.04**	**204.88**	**219.94**	**176.26**
Operating costs:										
Seed	12.54	11.97	9.11	8.65	10.16	9.65	14.41	13.69	13.70	13.02
Fertilizer [b]	46.07	36.26	22.62	17.36	68.36	52.46	61.62	47.28	39.20	30.08
Chemicals	2.53	2.43	3.81	3.75	0.98	0.97	2.48	2.44	2.03	2.00
Custom operations	9.18	9.24	2.80	2.80	3.06	3.06	12.02	12.02	12.61	12.61
Fuel, lube, and electricity	15.53	19.31	12.19	15.13	10.79	13.39	18.93	23.49	15.44	19.17
Repairs	12.94	13.11	14.19	14.46	10.44	10.64	13.33	13.59	12.20	12.43
Purchased irrigation water	2.84	2.87	0.84	0.86	0.27	0.27	2.01	2.05	6.20	6.32
Interest on operating inputs	0.15	0.10	0.10	0.06	0.15	0.09	0.18	0.11	0.15	0.10
Total, operating costs	**101.77**	**95.28**	**65.66**	**63.07**	**104.21**	**90.53**	**124.98**	**114.67**	**101.53**	**95.73**
Allocated overhead:										
Hired labor	0.79	0.81	0.37	0.38	0.40	0.40	1.63	1.65	0.22	0.22
Opportunity cost of unpaid labor	35.29	35.96	23.06	23.31	28.74	29.05	45.68	46.17	34.32	34.68
Capital recovery of machinery and equipment	67.94	69.30	75.03	77.06	53.25	54.69	66.27	68.06	68.70	70.56
Opportunity cost of land (rental rate)	89.44	91.85	64.58	66.50	51.18	52.70	87.51	90.11	122.96	126.60
Taxes and insurance	5.55	5.67	4.46	4.53	6.13	6.22	5.78	5.86	5.96	6.05
General farm overhead	8.93	9.07	7.74	7.89	5.67	5.78	9.66	9.84	9.94	10.13
Total, allocated overhead	**207.94**	**212.67**	**175.24**	**179.67**	**145.37**	**148.84**	**216.53**	**221.69**	**242.10**	**248.24**
Total, costs listed	**309.71**	**307.96**	**240.90**	**242.74**	**249.58**	**239.37**	**341.51**	**336.36**	**343.63**	**343.97**
Value of production less total costs listed	-73.96	-115.55	-60.42	-89.94	-87.89	-116.24	-92.47	-131.48	-123.69	-167.71
Value of production less operating costs	133.98	97.12	114.82	89.73	57.48	32.60	124.06	90.21	118.41	80.53
Supporting information:										
Yield (bushels per planted acre)	65	61.4	63	60	33	34	62	57	53	52
Price (dollars per bushel at harvest)	2.39	2.12	2.10	1.92	2.77	2.19	2.48	2.34	2.41	2.00
Enterprise size (planted acres) [a]	27	27	66	66	47	47	25	25	23	23
Production practices: [a]										
Irrigated (percent of acres)	1	1	2	2	5	5	0	0	0	0
Dryland (percent of acres)	99	99	98	98	95	95	100	100	100	100
Straw (percent of acres)	71	71	47	47	18	18	79	79	82	82

Source:
Economic Research Service, US Department of Agriculture,
http://www.ers.usda.gov/data/costsandreturns/testpick.htm

[a] Developed from survey base year, 2005.
[b] Cost of commercial fertilizers, soil conditioners, and manure.

Section: FEEDSTOCKS

Rice[a]: Area, Yield, Production, and Value, 1996-2009

Year	Area		Yield per harvested acre	Production	Marketing year average price per cwt. received by farmers	Value of production
	Planted	Harvested				
	1,000 Acres	1,000 Acres	Pounds	1,000 cwt.	Dollars	1,000 Dollars
1996	2,824	2,804	6,120	171,599	9.96	1,690,270
1997	3,125	3,103	5,897	182,992	9.70	1,756,136
1998	3,285	3,257	5,663	184,443	8.89	1,654,157
1999	3,531	3,512	5,866	206,027	5.93	1,231,207
2000	3,060	3,039	6,281	190,872	5.61	1,049,961
2001	3,334	3,314	6,496	215,270	4.25	925,055
2002	3,240	3,207	6,578	210,960	4.49	979,628
2003[b]	3,022	2,997	6,670	199,897	8.08	1,628,948
2004	3,347	3,325	6,988	232,362	7.33	1,701,822
2005	3,384	3,364	6,624	222,833	7.65	1,738,598
2006	2,838	2,821	6,898	194,585	9.96	1,990,783
2007	2,761	2,748	7,219	198,388	12.80	2,600,871
2008	2,995	2,976	6,846	203,733	16.80	3,603,460
2009	3,135	3,103	7,085	219,850	14.30	3,145,521

Source: U.S. Department of Agriculture, *2010 Agricultural Statistics*, Table 1-21 and previous annual editions,
http://www.nass.usda.gov/Publications/Ag_Statistics/index.asp

[a] Rough

[b] Sweet rice yield and production included in 2003 as short grain but not in previous years.

Section: FEEDSTOCKS

Rice: Area, Yield, and Production by State, 2007-2009[a]

State	Area Planted			Area harvested			Yield per harvested acre			Production		
	2007	2008	2009[b]	2007	2008	2009[b]	2007	2008	2009[b]	2007	2008	2009[b]
	1,000 Acres	1,000 Acres	1,000 Acres	1,000 Acres	1,000 Acres	1,000 Acres	Pounds	Pounds	Pounds	1,000 cwt.	1,000 cwt.	1,000 cwt.
Arkansas	1,331.0	1,401.0	1,486.0	1,325.0	1,395.0	1,470.0	7,230	6,660	6,800	95,814	92,938	99,924
California	534.0	519.0	561.0	533.0	517.0	556.0	8,200	8,320	8,600	43,684	43,030	47,804
Louisiana	380.0	470.0	470.0	378.0	464.0	464.0	6,140	5,830	6,300	23,222	27,037	29,217
Mississippi	190.0	230.0	245.0	189.0	229.0	243.0	7,350	6,850	6,700	13,892	15,687	16,281
Missouri	180.0	200.0	202.0	178.0	199.0	200.0	6,900	6,620	6,710	12,279	13,173	13,423
Texas	146.0	175.0	171.0	145.0	172.0	170.0	6,550	6,900	7,770	9,497	11,868	13,201
US	**2,761.0**	**2,995.0**	**3,135.0**	**2,748.0**	**2,976.0**	**3,103.0**	**7,219**	**6,846**	**7,085**	**198,388**	**203,733**	**219,850**

Source: U.S. Department of Agriculture, *2010 Agricultural Statistics,* Table 1-27, http://www.nass.usda.gov/Publications/Ag_Statistics/index.asp

[a] Sweet rice acreage included with short grain.

[b] Preliminary

Section: FEEDSTOCKS

Rice Production Costs and Returns per Planted Acre by Region, Excluding Government Payments, 2009-2010

(dollars per planted acre)

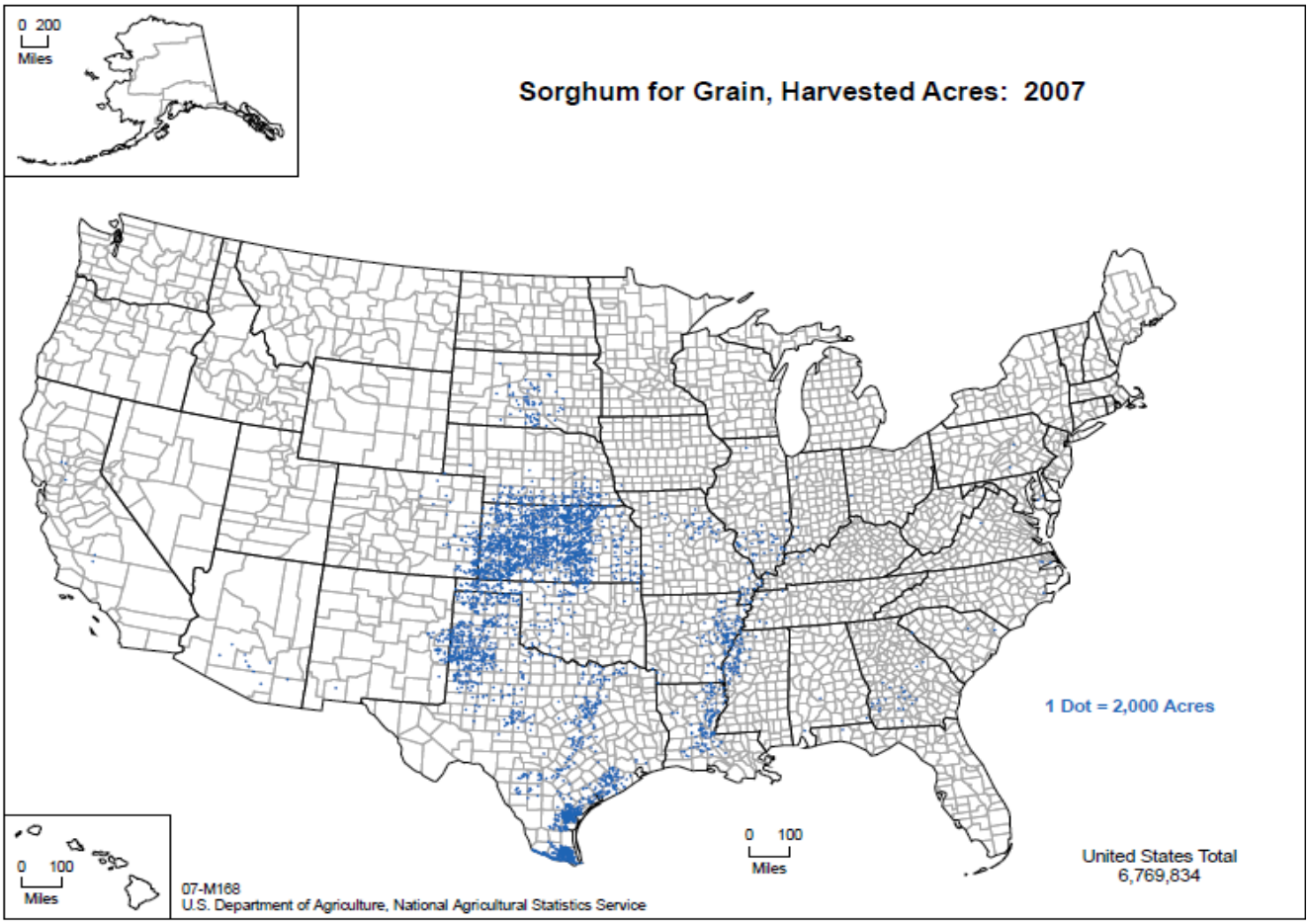
	United States		Ark Non-Delta		California		Mississippi River Delta		Gulf Coast	
Item	**2009**	**2010**	**2009**	**2010**	**2009**	**2010**	**2009**	**2010**	**2009**	**2010**
Gross value of production										
Primary product: Rice	1072.84	795.75	927.50	681.39	1594.44	1316.00	974.16	717.10	996.04	713.30
Total, gross value of production	**1072.84**	**795.75**	**927.50**	**681.39**	**1594.44**	**1316.00**	**974.16**	**717.10**	**996.04**	**713.30**
Operating costs:										
Seed	65.48	65.65	61.20	61.58	73.72	74.17	70.05	70.48	62.45	62.84
Fertilizer [b]	105.26	79.20	89.57	67.91	119.87	90.88	102.23	77.51	129.47	98.16
Chemicals	75.39	73.65	66.05	65.45	105.77	104.82	65.29	64.70	78.42	77.71
Custom operations	49.03	48.03	31.95	32.35	93.80	94.98	38.95	39.44	55.74	56.44
Fuel, lube, and electricity	91.80	115.02	97.94	121.56	60.79	75.45	92.75	115.13	106.05	131.64
Repairs	28.50	29.09	29.95	30.52	27.56	28.08	27.00	27.52	27.78	28.31
Purchased irrigation water	12.42	11.24	0.21	0.21	49.19	49.81	0.00	0.00	18.28	18.51
Commercial drying	20.34	23.15	12.15	14.44	34.79	40.17	9.67	11.84	36.23	42.54
Interest on operating inputs	0.62	0.42	0.55	0.38	0.77	0.52	0.57	0.39	0.69	0.47
Total, operating costs	**448.84**	**445.45**	**389.57**	**394.40**	**566.26**	**558.88**	**406.51**	**407.01**	**515.11**	**516.62**
Allocated overhead:										
Hired labor	20.08	20.23	21.44	21.67	25.94	26.22	21.62	21.85	10.04	10.15
Opportunity cost of unpaid labor	45.42	44.95	38.62	39.04	71.28	72.04	31.65	31.99	50.91	51.45
Capital recovery of machinery and equipment	117.81	120.81	120.21	123.46	123.47	126.80	109.48	112.43	116.04	119.17
Opportunity cost of land (rental rate)	168.20	167.61	127.18	130.96	333.03	342.91	120.10	123.67	156.36	160.99
Taxes and insurance	18.25	18.65	18.76	19.04	15.76	15.99	22.79	23.12	14.64	14.85
General farm overhead	25.86	26.00	20.71	21.11	37.31	38.02	29.12	29.67	23.15	23.59
Total, allocated overhead	**395.62**	**398.25**	**346.92**	**355.28**	**606.79**	**621.98**	**334.76**	**342.73**	**371.14**	**380.20**
Total, costs listed	**844.46**	**843.70**	**736.49**	**749.68**	**1,173.05**	**1,180.86**	**741.27**	**749.74**	**886.25**	**896.82**
Value of production less total costs listed	228.38	-47.95	191.01	-68.29	421.39	135.14	232.89	-32.64	109.79	-183.52
Value of production less operating costs	624.00	350.30	537.93	286.99	1028.18	757.12	567.65	310.09	480.93	196.68
Supporting information:										
Price (dollars per cwt at harvest)	14.49	11.3	13	10	19	16	14	10	13	10
Yield (cwt per planted acre)	74.04	70.42	70.00	67.00	86.00	80.00	72.00	71.00	74.00	70.00
Enterprise size (planted acres) [a]	511	511	521	521	431	431	634	634	469	469

Source:
Economic Research Service, US Department of Agriculture,
http://www.ers.usda.gov/data/costsandreturns/testpick.htm

[a] Developed from survey base year, 2006.
[b] Cost of commercial fertilizers, soil conditioners, and manure.

Sorghum is currently a small contributor to ethanol production, but because it is largely grown in an area of the country that does not significantly overlap with corn production, it could become important in expanding the range of locations of ethanol production facilities.

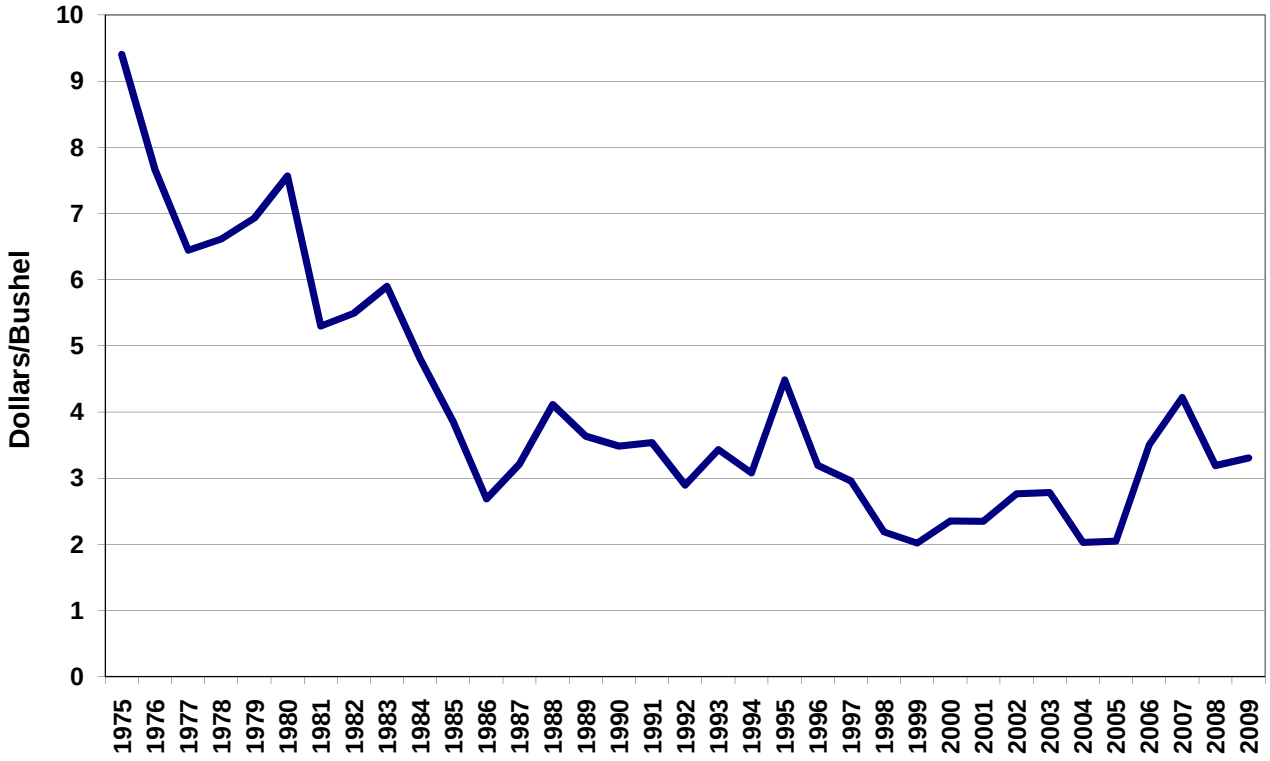
Section: FEEDSTOCKS
Sorghum for Grain, Harvested Acres, 2007



Source:
U.S. Department of Agriculture, National Agricultural Statistics Service, The Census of Agriculture
http://www.agcensus.usda.gov/Publications/2007/Online_Highlights/Ag_Atlas_Maps/Crops_and_Plants/

The price for sorghum declined from 1975 to 1999 but has stabilized and even shown some increase in recent years. Sorghum has a different geographic distribution than corn but has similar properties, making it a viable crop for the production of ethanol. The price fluctuation for sorghum is also very similar to that of corn.

Section: FEEDSTOCKS
Sorghum: Price per Bushel, 1975-2009
(Constant 2009 dollars)



Source:
U.S. Department of Agriculture, National Agricultural Statistics Service
http://www.nass.usda.gov/

Sorghum is grown in areas that are generally too dry for unirrigated corn, thus potential resource areas for starch based ethanol can be expanded through use of sorghum. Grain weight per bushel is 56 lbs. at assumed harvest moisture content of 14%.

Section: FEEDSTOCKS
Sorghum: Area, Yield, Production, and Value, 1996-2009

Year	Area Planted for all purposes[a]	Sorghum for grain[b]					Sorghum for silage		
		Area harvested	Yield per harvested acre	Production	Marketing year average price per cwt[c]	Value of production[c]	Area Harvested	Yield per harvested acre	Production
	1,000 Acres	1,000 Acres	Bushels	1,000 Bushels	Dollars	1,000 Dollars	1,000 Acres	Tons	1,000 Tons
1996	13,097	11,811	67.3	795,274	4.17	1,986,316	423	11.8	4,976
1997	10,052	9,158	69.2	633,545	3.95	1,408,534	412	13.1	5,385
1998	9,626	7,723	67.3	519,933	2.97	904,123	308	11.4	3,526
1999	9,288	8,544	69.7	595,166	2.80	937,081	320	11.6	3,716
2000	9,195	7,726	60.9	470,526	3.37	845,755	278	10.5	2,932
2001	10,248	8,579	59.9	514,040	3.46	978,783	352	11.0	3,860
2002	9,589	7,125	50.6	360,713	4.14	855,140	408	9.6	3,913
2003	9,420	7,798	52.7	411,219	4.26	964,978	343	10.4	3,558
2004	7,486	6,517	69.6	453,606	3.19	843,344	352	13.6	4,782
2005	6,454	5,736	68.5	392,739	3.33	736,629	311	13.6	4,224
2006	6,522	4,937	56.1	276,824	5.88	883,204	347	13.3	4,612
2007	7,712	6,792	73.2	497,445	7.28	1,925,312	392	13.4	5,246
2008	8,284	7,271	65.0	472,342	5.72	1,631,065	408	13.8	5,646
2009[d]	6,633	5,520	69.4	382,983	5.90	1,242,196	254	14.5	3,680

Source:
USDA, *2010, Agricultural Statistics*, Table 1-62,
http://www.nass.usda.gov/Publications/Ag_Statistics/index.asp

[a] Grain and sweet sorghum for all uses, including syrup.
[b] Includes both grain sorghum for grain, and sweet sorghum for grain or seed.
[c] Based on the reported price of grain sorghum; cwt = 100 pounds.
[d] Preliminary.

Sorghum is used for ethanol production only in the two states that planted over 2 million acres, Kansas and Texas.

Section: FEEDSTOCKS
Sorghum: Area, Yield, and Production, by State, 2007-2009

State	Area planted for all purposes			Sorghum for grain								
				Area harvested			Yield per harvested acre			Production		
	2007	2008	2009[a]	2007	2008	2009[a]	2007	2008	2009[a]	2007	2008	2009[a]
	1,000 Acres	1,000 Acres	1,000 Acres	1,000 Acres	1,000 Acres	1,000 Acres	Bushels	Bushels	Bushels	1,000 Bushels	1,000 Bushels	1,000 Bushels
Alabama[b]	12	12	***	6	6	8	40	53	85	240	318	***
Arizona	42	57	35	20	27	37	90	90	79	1800	2,430	680
Arkansas	225	125	40	215	115	***	96	88	***	20,640	10,120	2,923
California[b]	39	47	***	10	9	***	85	95	***	850	855	***
Colorado	220	230	180	150	150	150	37	30	45	5,550	4,500	6,750
Georgia	65	60	55	45	44	40	46	45	53	2,070	1,980	2,120
Illinois	80	80	40	77	76	36	81	103	82	6,237	7,828	2,952
Kansas	2,800	2,900	2,700	2,650	2,750	2,550	79	78	88	209,350	214,500	224,400
Kentucky[b]	15	13	***	12	11	***	90	90	***	1,080	990	***
Louisiana	250	120	70	245	110	65	95	87	82	23,275	9,570	5,330
Mississippi	145	85	13	115	82	11	85	71	70	9,775	5,822	770
Missouri	110	90	50	100	80	43	96	97	86	9,600	7,760	3,698
Nebraska	350	300	235	240	210	140	94	91	93	22,560	19,110	13,020
New Mexico	105	130	85	75	80	50	40	43	46	3,000	3,440	2,300
North Carolina[b]	12	16	***	8	13	***	55	56	***	440	728	***
Oklahoma	240	350	250	220	310	220	56	45	56	12,320	13,950	12,320
Pennsylvania[b]	15	11	***	3	3	***	56	37	***	168	111	***
South Carolina[b]	9	12	***	6	8	***	35	46	***	210	368	***
South Dakota	210	170	180	130	115	120	60	64	61	7,800	7,360	7,320
Tennessee[b]	18	26	***	15	22	***	82	91	***	1,230	2,002	***
Texas	2,750	3,450	2,700	2,450	3,050	2,050	65	52	48	159,250	158,600	98,400
US	**7,712**	**8,284**	**6,633**	**6,792**	**7,271**	**5,520**	**73**	**65**	**69.4**	**497,445**	**472,342**	**382,983**

Source:
USDA, *2010 Agricultural Statistics*, Table 1-65,
http://www.nass.usda.gov/Publications/Ag_Statistics/index.asp

[a] Preliminary.
[b] Estimates discontinued in 2009

The lower yields of sorghum grain results in lower profit in sorghum production compared to corn. Sorghum biomass production can be quite high, making it a potential source of crop residue in some areas of the country.

Section: FEEDSTOCKS

Sorghum Production Costs and Returns per Planted Acre by Region, Excluding Government Payments, 2009-2010[a]

(dollars per planted acre)

Item	United States		Heartland		Prairie Gateway		Fruitful Rim		Northern Great Plains	
	2009	**2010**	**2009**	**2010**	**2009**	**2010**	**2009**	**2010**	**2009**	**2010**
Gross value of production:										
Primary product: Sorghum	183.6	292.79	248.80	338.92	202.34	300.56	125.02	269.75	151.90	204.45
Secondary product: Sorgum silage	9.32	9.46	0.00	0.00	12.3	12.03	0.00	0.00	5.46	5.05
Total, gross value of production	**192.92**	**302.25**	**248.80**	**338.92**	**214.64**	**312.59**	**125.02**	**269.75**	**157.36**	**209.5**
Operating costs:										
Seed	7.47	7.58	12.31	12.62	6.88	7.05	8.96	9.18	9.61	9.85
Fertilizer[b]	43.41	33.22	85.94	65.9	42.45	32.55	46.42	35.59	37.01	28.38
Chemicals	21.18	21.34	24.48	24.15	24.83	24.5	9.06	8.94	17.46	17.23
Custom operations	11.37	10.37	6.73	6.14	11.3	10.31	12.25	11.17	8.83	8.05
Fuel, lube, and electricity	36.76	47.61	15.16	18.46	42.60	53.07	22.67	33.14	7.18	8.82
Repairs	19.27	19.79	17.28	17.61	20.4	20.79	17.3	17.63	9.06	9.23
Purchased irrigation water	0.15	0.12	0.00	0.00	0.00	0.00	0.69	0.63	0.19	0.17
Interest on operating inputs	0.21	1.4	0.23	1.45	0.22	1.48	0.17	1.16	0.13	0.82
Total, operating costs	**139.82**	**141.43**	**162.13**	**146.33**	**148.68**	**149.75**	**117.52**	**117.44**	**89.47**	**82.55**
Allocated overhead:										
Hired labor	6.11	5.89	2.61	2.64	3.8	3.84	15.26	15.42	0.65	0.66
Opportunity cost of unpaid labor	29.87	30.42	28.04	28.34	31.7	32.04	25.84	26.12	17.44	17.63
Capital recovery of machinery and equipment	78.96	81.13	69.67	71.23	81.99	83.83	73.59	75.24	52.73	53.91
Opportunity cost of land	44.7	48.39	86.55	93.89	43.75	47.46	45.91	49.8	47.970	52.04
Taxes and insurance	5.42	4.74	29.44	25.61	5.52	4.8	3.820	3.32	7.72	6.710
General farm overhead	8.58	8.6	29.27	29.83	7.39	7.53	11.33	11.55	12.12	12.35
Total, allocated overhead	173.64	179.17	245.58	251.54	174.15	179.5	175.75	181.45	138.63	143.3
Total costs listed	**313.46**	**320.6**	**407.71**	**397.87**	**322.83**	**329.25**	**293.27**	**298.89**	**228.1**	**225.85**
Value of production less total costs listed	-120.54	-18.35	-158.91	-58.95	-108.19	-16.66	-168.25	-29.14	-70.74	-16.35
Value of production less operating costs	53.10	160.82	86.67	192.59	65.96	162.84	7.5	152.310	67.89	126.95
Supporting information:										
Sorghum Yield: bushels per planted acre	60	67	80	74	67	68	38	65	49	47
Price: dollars per bushel	3.06	4.37	3.11	4.58	3.02	4.42	3.29	4.15	3.1	4.35
Enterprise size (planted acres)[a]	297	297	125	125	269	269	785	785	272	272
Production practices:[a]	100	100	1	1	72	72	23	23	3	3
Irrigated (percent)	11	11	6	6	13	13	13	13	13	13
Dryland (percent)	89	89	94	94	87	87	87	87	87	87

Source:
Economic Research Service, U.S. Department of Agriculture,
http://www.ers.usda.gov/data/costsandreturns/testpick.htm

[a] Developed from survey base year, 2003.
[b] Commercial fertilizer and soil conditioners.

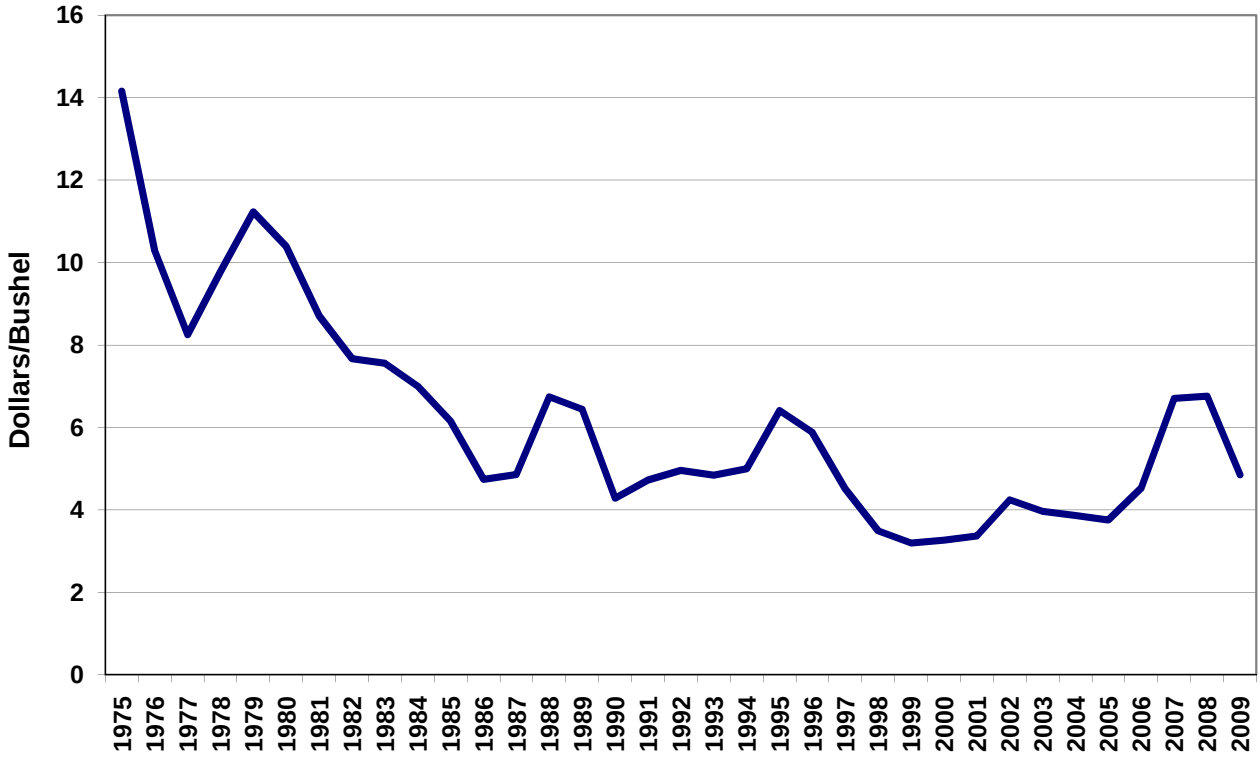
Section: FEEDSTOCKS
Wheat Baseline Projections, 2009 - 2021

Item	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
Area (million acres):												
Planted acres	59.2	53.6	57.0	55.5	54.0	53.0	52.0	51.5	51.5	51.5	51.0	51.0
Harvested acres	49.9	47.6	48.5	47.2	45.9	45.1	44.2	43.8	43.8	43.8	43.4	43.4
Yields (bushels per acre):												
Yield/harvested acre	44.5	46.4	43.8	44.2	44.5	44.8	45.2	45.5	45.8	46.1	46.5	46.8
Supply and use (million bushels):												
Beginning stocks	657	976	848	718	706	746	759	743	718	694	682	661
Production	2,218	2,208	2,125	2,085	2,045	2,020	2,000	1,995	2,005	2,020	2,020	2,030
Imports	119	110	110	110	110	115	115	120	120	125	125	130
Supply	2,993	3,294	3,083	2,913	2,861	2,881	2,874	2,858	2,843	2,839	2,827	2,821
Food	917	940	950	959	968	977	986	995	1,004	1,013	1,022	1,031
Seed	69	76	75	73	72	70	70	70	70	69	69	69
Feed and Residual	150	180	190	175	175	175	175	175	175	175	175	175
Domestic Use	1,137	1,196	1,215	1,207	1,215	1,222	1,231	1,240	1,249	1,257	1,266	1,275
Exports	881	1,250	1,150	1,000	900	900	900	900	900	900	900	900
Total use	2,018	2,446	2,365	2,207	2,115	2,122	2,131	2,140	2,149	2,157	2,166	2,175
Ending stocks	976	848	718	706	746	759	743	718	694	682	661	646
Stocks/use ratio, percent	48.4	34.7	30.4	32.0	35.3	35.8	34.9	33.6	32.3	31.6	30.5	29.7
Prices (dollars per bushel):												
Farm price	4.87	5.50	6.50	5.90	5.55	5.45	5.45	5.50	5.50	5.55	5.55	5.60
Variable costs of production (dollars):												
Per acre	128.51	125.24	132.70	135.57	137.68	139.84	142.32	145.16	147.90	150.66	153.60	156.59
Per bushel	2.89	2.70	3.03	3.07	3.09	3.12	3.15	3.19	3.23	3.27	3.30	3.35
Returns over variable costs (dollars per acre):												
Net returns	88	130	152	125	109	104	104	105	104	105	104	105

Source:
USDA Long-Term Agricultural, Projection Tables to 2020 , February 2011, Table 23 - "U.S. Wheat Long-Term Projections",
http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1192

Overall, the price for wheat has been declining due to improvements in farming techniques.

Section: FEEDSTOCKS
Wheat: Price per Bushel, 1975-2009
(constant 2009 dollars)



Source:
U.S. Department of Agriculture, National Agricultural Statistics Service
http://www.nass.usda.gov/

Section: FEEDSTOCKS
Wheat: Area, Yield, Production, and Value, 1996-2009

Year	Area		Yield per harvested acre	Production	Marketing year average price per bushel received by farmers[b]	Value of production[b]
	Planted[a]	harvested				
	1,000 Acres	1,000 Acres	Bushels	1,000 Bushels	Dollars	1,000 Dollars
1996	75,105	62,819	36.3	2,277,388	4.30	9,782,238
1997	70,412	62,840	39.5	2,481,466	3.38	8,286,741
1998	65,821	59,002	43.2	2,547,321	2.65	6,780,623
1999	62,664	53,773	42.7	2,295,560	2.48	5,586,675
2000	62,549	53,063	42.0	2,228,160	2.62	5,771,786
2001	59,432	48,473	40.2	1,947,453	2.78	5,412,834
2002	60,318	45,824	35.0	1,605,878	3.56	5,637,416
2003	62,141	53,063	44.2	2,344,415	3.40	7,927,981
2004	59,644	49,969	43.2	2,156,790	3.40	7,277,932
2005	57,214	50,104	42.0	2,103,325	3.42	7,167,166
2006	57,344	46,800	38.6	1,808,416	4.26	7,694,734
2007	60,460	50,999	40.2	2,051,088	6.48	13,289,326
2008	63,193	55,699	44.9	2,499,164	6.78	16,625,759
2009	59,133	49,868	44.4	2,216,171	4.85	10,626,176

Source: U.S. Department of Agriculture, *2010 Agricultural Statistics*, Table 1-2 and previous annual editions, http://www.nass.usda.gov/Publications/Ag_Statistics/index.asp

[a] Includes area seeded in preceding fall for winter wheat.

[b] Includes allowance for loans outstanding and purchases by the Government valued at the average loan and purchase rate, by States, where applicable.

Section: FEEDSTOCKS
Wheat: Area, Yield, and Production, by State, 2007-2009

State	Area planted[a]			Area harvested			Yield per harvested acre			Production		
	2007	2008	2009	2007	2008	2009	2007	2008	2009	2007	2008	2009
	1,000 Acres	1,000 Acres	1,000 Acres	1,000 Acres	1,000 Acres	1,000 Acres	Bushels	Bushels	Bushels	1,000 Bushels	1,000 Bushels	1,000 Bushels
Alabama	120	240	220	76	200	180	42.0	71.0	55.0	3,192	14,200	9,900
Arizona	89	159	132	86	155	129	101.4	97.9	99.4	8,724	15,172	12,825
Arkansas	820	1070	430	700	980	390	41.0	57.0	44.0	28,700	55,860	17,160
California	640	840	770	345	545	485	85.4	90.3	87.0	29,465	49,225	42,200
Colorado	2,520	2,190	2,630	2,369	1,936	2,479	39.2	30.8	40.6	92,980	59,700	100,610
Delaware	57	80	70	55	79	67	68.0	77.0	62.0	3,740	6	4,154
Florida	13	25	17	9	23	14	55.0	55.0	43.0	495	1,265	602
Georgia	360	480	340	230	400	250	40.0	56.0	42.0	9,200	22,400	10,500
Idaho	1,235	1,400	1,310	1,175	1,330	1,250	71.2	73.8	79.3	83,645	98,170	99,130
Illinois	1,000	1,200	850	890	1,150	820	55.0	64.0	56.0	48,950	73,600	45,920
Indiana	420	580	470	370	560	450	56.0	69.0	67.0	20,720	38,640	30,150
Iowa	35	40	28	28	35	22	48.0	48.0	45.0	1,344	1,680	990
Kansas	10,400	9,600	9,300	8,600	8,900	8,800	33.0	40.0	42.0	283,800	356,000	369,600
Kentucky	440	580	510	250	460	390	48.0	71.0	57.0	12,000	32,660	22,230
Louisiana	235	400	185	220	385	175	54.0	57.0	56.0	11,880	21,945	9,800
Maryland	220	255	230	160	180	195	66.0	73.0	60.0	10,560	13,140	11,700
Michigan	550	730	620	530	710	560	65.0	69.0	69.0	34,450	48,990	38,640
Minnesota	1,765	1,925	1,655	1,710	1,870	1,595	47.9	55.9	52.8	81,900	104,440	84,175
Mississippi	370	520	180	330	485	165	56.0	62.0	50.0	18,480	30,070	8,250
Missouri	1,050	1,250	780	880	1,160	730	43.0	48.0	47.0	37,840	55,680	34,310
Montana	5,170	5,740	5,520	5,065	5,470	5,305	29.6	30.1	33.3	149,820	164,730	176,625
Nebraska	2,050	1,750	1,700	1,960	1,670	1,600	43.0	44.0	48.0	84,280	73,480	76,800
Nevada	23	21	20	13	11	13	99.2	100.1	97.8	1,290	1,101	1,272
New Jersey	31	35	34	28	33	29	51.0	61.0	51.0	1,428	2,013	1,479
New Mexico	490	430	450	300	140	140	28.0	30.0	25.0	8,400	4	3,500
New York	100	130	115	85	122	105	53.0	63.0	65.0	4,505	7,686	6,825
North Carolina	630	820	700	500	720	600	40.0	60.0	49.0	20,000	43,200	29,400
North Dakota	8,595	9,230	8,680	8,405	8,640	8,415	35.6	36.0	44.8	298,875	311,200	377,190
Ohio	820	1,120	1,010	730	1,090	980	61.0	68.0	72.0	44,530	74	70,560
Oklahoma	5,900	5,600	5,700	3,500	4,500	3,500	28.0	37.0	22.0	98,000	166,500	77,000
Oregon	855	960	890	835	945	877	52.3	55.7	55.7	43,680	52,600	48,858
Pennsylvania	170	195	190	155	185	175	58.0	64.0	56.0	8,990	11,840	9,800
South Carolina	160	220	165	135	205	150	30.0	54.0	47.0	4,050	11,070	7,050
South Dakota	3,508	3,661	3,209	3,327	3,420	3,009	43.1	50.5	42.9	143,515	172,540	129,147
Tennessee	420	620	430	260	520	340	41.0	63.0	51.0	10,660	32,760	17,340
Texas	6,200	5,800	6,400	3,800	3,300	2,450	37.0	30.0	25.0	140,600	99,000	61,250
Utah	146	150	154	132	139	147	42.8	41.4	49.5	5,656	5,756	7,278
Virginia	230	310	250	205	280	210	64.0	71.0	58.0	13,120	19,880	12,180
Washington	2,170	2,290	2,290	2,137	2,255	2,225	58.7	52.7	55.3	125,342	118,790	123,085
West Virginia	8	11	9	6	8	5	57.0	60.0	50.0	342	480	250
Wisconsin	299	373	335	278	357	315	67.1	64.5	68.0	18,640	23,012	21,420
Wyoming	146	163	155	130	146	132	25.4	29.4	38.0	3,300	4,286	5,016
US	**60,460**	**63,193**	**59,133**	**50,999**	**55,699**	**49,868**	**40.2**	**44.9**	**44.4**	**2,051,088**	**2,499,164**	**2,216,171**

Source:
U.S. Department of Agriculture, *2010 Agricultural Statistics*, Table 1-6,
http://www.nass.usda.gov/Publications/Ag_Statistics/index.asp

[a] Includes area planted preceding fall.

Section: FEEDSTOCKS
Wheat: Supply and Disappearance, 1996-2009
(million bushels)

Year (beginning September 1)	Supply				Disappearance						Ending stocks May 31
					Domestic use						
	Beginning stocks	Production	Imports[a]	Total	Food	Seed	Feed[b]	Total	Exports[a]	Total disappearance	
1996	376	2,277	92	2,746	891	102	308	1,301	1,002	2302	444
1997	444	2,481	95	3,020	914	92	251	1,257	1,040	2,298	722
1998	722	2,547	103	3,373	909	81	391	1,381	1,046	2,427	946
1999	946	2,296	95	3,336	929	92	279	1,300	1,086	2,386	950
2000	950	2,228	90	3,268	950	79	300	1,330	1,062	2,392	876
2001	876	1,947	108	2,931	926	83	182	1,192	962	2,154	777
2002	777	1,606	77	2,460	919	84	116	1,119	850	1,969	491
2003	491	2,344	63	2,899	912	80	203	1,194	1,158	2,353	546
2004	546	2,157	71	2,774	910	78	181	1,168	1,066	2,234	540
2005	540	2,103	81	2,725	917	77	157	1,151	1,003	2,154	571
2006	571	1,808	122	2,501	938	82	117	1,137	908	2,045	456
2007	456	2,051	113	2,620	947	88	115	1,050	1,264	2,314	306
2008	306	2,499	127	2,932	927	78	255	1,260	1,015	2,275	657
2009 [c]	657	2,216	119	2,991	917	70	149	1,137	881	2,018	973

Source:
U.S. Department of Agriculture, *2010 Agricultural Statistics* , Table 1-7, and previous annual editions,
http://www.nass.usda.gov/Publications/Ag_Statistics/index.asp

[a] Imports and exports include flour and other products expressed in wheat equivalent.
[b] Approximates feed and residual use and includes negligible quantities used for distilled spirits.
[c] Preliminary. Totals may not add due to independent rounding.

Section: FEEDSTOCKS
Wheat: Marketing Year Average Price and Value, by State, Crop of 2007, 2008, and 2009

State[a]	Marketing year average price per bushel 2007	2008	2009[b]	Value of production 2007	2008	2009[b]
	Dollars	Dollars	Dollars	1,000 Dollars	1,000 Dollars	1,000 Dollars
Alabama	5.30	5.95	4.60	16,918	84,490	45,540
Arizona	7.03	8.27	8.85	61,329	125,993	112,970
Arkansas	4.72	5.88	4.85	135,464	328,457	83,226
California	5.41	7.08	5.70	159,583	352,644	240,600
Colorado	6.01	6.62	4.50	561,326	397,140	451,962
Delaware	5.56	5.96	3.50	20,794	36,255	14,539
Florida	4.00	5.50	4.30	1,980	6,958	2,589
Georgia	6.50	5.95	4.30	59,800	133,280	45,150
Idaho	6.56	6.38	4.75	549,000	626,694	469,179
Illinois	5.37	5.89	3.85	262,862	433,504	176,792
Indiana	5.20	5.91	4.20	107,744	228,362	126,630
Iowa	5.25	5.90	3.95	7,056	9,912	3,911
Kansas	5.93	6.94	4.85	1,682,934	2,470,640	1,792,560
Kentucky	5.28	5.60	4.60	63,360	182,896	102,258
Louisiana	5.20	5.50	4.70	61,776	120,698	46,060
Maryland	5.97	5.89	3.60	63,043	77,395	42,120
Michigan	5.01	5.63	4.25	172,595	275,814	164,220
Minnesota	7.28	7.06	4.80	595,467	739,133	402,825
Mississippi	4.30	5.36	4.50	79,464	161,175	37,125
Missouri	5.17	5.35	4.30	195,633	297,888	147,533
Montana	7.14	6.84	5.15	1,075,754	1,138,548	906,149
Nebraska	5.82	6.68	4.90	490,510	490,846	376,320
Nevada	6.50	6.79	4.65	8,363	7,478	5,934
New Jersey	5.80	6.15	3.75	8,282	12,380	5,546
New Mexico	5.50	7.70	4.70	46,200	32,340	16,450
New York	6.92	6.16	4.70	31,175	47,346	32,078
North Carolina	4.90	5.80	4.35	98,000	251,424	127,890
North Dakota	7.74	7.31	4.85	2,339,614	2,296,523	1,822,071
Ohio	5.37	5.82	4.35	239,126	431,378	306,936
Oklahoma	6.22	6.93	4.80	609,560	1,153,845	369,600
Oregon	8.23	6.56	4.60	358,968	343,104	223,633
Pennsylvania	6.60	5.42	4.10	59,334	64,173	40,180
South Carolina	4.55	5.95	4.85	18,428	65,867	34,193
South Dakota	6.42	6.92	5.10	899,263	1,199,255	661,874
Tennessee	5.05	5.71	4.65	53,833	187,060	80,631
Texas	6.40	7.58	5.25	899,840	750,420	321,563
Utah	8.30	7.97	6.30	46,822	45,855	40,090
Virginia	5.78	5.88	4.05	75,834	116,894	49,329
Washington	7.58	6.26	4.80	949,132	745,163	585,473
West Virginia	6.17	5.85	4.20	2,110	2,808	1,050
Wisconsin	5.30	5.47	4.10	99,002	125,803	87,822
Wyoming	6.68	6.51	4.70	22,048	27,921	23,575
US	**6.48**	**6.78**	**4.85**	**13,289,326**	**16,625,759**	**10,626,176**

Source: U.S. Department of Agriculture, *2010 Agricultural Statistics,* Table 1-10, http://www.nass.usda.gov/Publications/Ag_Statistics/index.asp

[a] States with no data are not listed.

[b] Preliminary

Section: FEEDSTOCKS

Wheat Production Costs and Returns per Planted Acre by Region, Excluding Government Payments, 2009-2010

(dollars per planted acre)

Item	United States		Northern Great Plains		Prarie Gateway		Basin and Range		Fruitful Rim		Northern Crescent		Heartland	
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
Gross value of production														
Primary product: Wheat grain	218.97	207.93	239.26	241.50	167.04	146.86	282.49	328.72	300.78	347.05	321.18	357.57	274.39	272.27
Secondary product: Silage, straw, grazing	7.98	7.31	3.34	3.06	9.44	8.65	3.64	3.33	11.17	10.23	26.91	24.64	16.13	14.77
Total, gross value of production	**226.95**	**215.24**	**242.60**	**244.56**	**176.48**	**155.51**	**286.13**	**332.05**	**311.95**	**357.28**	**348.09**	**382.21**	**290.52**	**287.04**
Operating costs:														
Seed	15.82	11.76	16.47	12.45	11.08	8.37	22.11	16.72	18.88	14.28	41.03	31.02	32.55	24.61
Fertilizer[b]	53.45	41.23	45.96	36.12	46.97	36.92	74.20	58.32	60.63	47.66	110.99	87.24	106.73	83.89
Chemicals	10.25	10.37	17.56	17.29	4.62	4.55	17.20	16.94	10.82	10.66	6.62	6.52	5.92	5.83
Custom operations	7.90	7.92	8.22	8.22	7.54	7.54	7.56	7.56	8.23	8.23	12.91	12.91	7.11	7.11
Fuel, lube, and electricity	17.13	21.57	8.68	10.77	21.08	26.17	12.96	16.09	52.90	65.66	10.43	12.95	8.28	10.28
Repairs	13.72	14.06	11.59	11.81	14.84	15.13	14.73	15.01	21.10	21.50	12.49	12.73	10.42	10.61
Purchased irrigation water and straw baling	0.38	0.40	0.12	0.13	0.09	0.09	0.94	0.95	3.37	3.41	0.94	0.95	0.65	0.66
Interest on operating inputs	0.17	0.11	0.16	0.10	0.15	0.10	0.22	0.13	0.26	0.17	0.28	0.16	0.25	0.14
Total, operating costs	**118.82**	**107.42**	**108.76**	**96.89**	**106.37**	**98.87**	**149.92**	**131.72**	**176.19**	**171.57**	**195.69**	**164.48**	**171.91**	**143.13**
Allocated overhead:														
Hired labor	2.74	2.85	2.10	2.13	2.65	2.68	4.60	4.65	8.24	8.33	1.36	1.37	1.19	1.20
Opportunity cost of unpaid labor	23.82	24.15	16.29	16.47	27.58	27.88	30.91	31.24	38.48	38.89	28.45	28.75	19.14	19.35
Capital recovery of machinery and equipmen	62.64	64.63	58.17	59.74	60.23	61.86	75.75	77.80	99.58	102.28	69.64	71.52	60.97	62.62
Opportunity cost of land (rental rate)	57.34	58.59	54.76	56.38	43.27	44.55	73.79	75.98	110.41	113.69	95.42	98.25	105.58	108.71
Taxes and insurance	8.62	8.83	10.97	11.13	6.22	6.31	11.00	11.16	10.97	11.13	12.40	12.58	7.95	8.07
General farm overhead	9.21	9.43	10.54	10.75	7.28	7.41	9.85	10.04	13.09	13.34	16.50	16.81	9.70	9.89
Total, allocated overhead	**164.37**	**168.48**	**152.83**	**156.60**	**147.23**	**150.69**	**205.90**	**210.87**	**280.77**	**287.66**	**223.77**	**229.28**	**204.53**	**209.84**
Total, costs listed	**283.19**	**275.90**	**261.59**	**253.49**	**253.60**	**249.56**	**355.82**	**342.59**	**456.96**	**459.23**	**419.46**	**393.76**	**376.44**	**352.97**
Value of production less total costs listed	-56.24	-60.66	-18.99	-8.93	-77.12	-94.05	-69.69	-10.54	-145.01	-101.95	-71.37	-11.55	-85.92	-65.93
Value of production less operating costs	108.13	107.82	133.84	147.67	70.11	56.64	136.21	200.33	135.76	185.71	152.40	217.73	118.61	143.91
Supporting information:														
Yield (bushels per planted acre)	40.4	45.4	46.1	48.3	28.9	36.9	53.3	61.1	55.7	63.1	70.9	68.5	61.8	57.2
Price (dollars per bushel at harvest)	5.42	4.58	5.19	5.00	5.78	3.98	5.30	5.38	5.40	5.50	4.53	5.22	4.44	4.76
Enterprise size (planted acres)[a]	412	412	618	618	443	443	858	858	584	584	87	87	104	104
Production practices:[a]														
Winter wheat (percent of acres)	67	67	27	27	100	100	75	75	72	72	93	93	83	83
Spring wheat (percent of acres)	28	28	61	61	0	0	25	25	27	27	7	7	17	17
Durum wheat (percent of acres)	[c]	[c]	12	12	0	0	0	0	[c]	[c]	0	0	0	0
Irrigated (percent of acres)	5	5	[c]	[c]	7	7	8	8	23	23	0	0	0	0
Dryland (percent of acres)	95	95	99	99	93	93	92	92	67	67	100	100	100	100
Straw (percent of acres)	7	7	5	5	[c]	[c]	6	6	13	13	42	42	23	23

Source:
Economic Research Service, US Department of Agriculture,
http://www.ers.usda.gov/data/costsandreturns/testpick.htm

[a] Developed from survey base year, 2004.
[b] Cost of commercial fertilizers, soil conditioners, and manure.
[c] 0.1 to less than 5 percent.

Section: FEEDSTOCKS
Oil per Acre Production for Various Crops

Plant	Latin Name	Oil/ Acre (gallons)	Plant	Latin Name	Oil/ Acre (gallons)
Oil Palm	Elaeis guineensis	610	Rice	Oriza sativa L.	85
Macauba Palm	Acrocomia aculeata	461	Buffalo Gourd	Cucurbita foetidissima	81
Pequi	Caryocar brasiliense	383	Safflower	Carthamus tinctorius	80
Buriti Palm	Mauritia flexuosa	335	Crambe	Crambe abyssinica	72
Oiticia	Licania rigida	307	Sesame	Sesamum indicum	71
Coconut	Cocos nucifera	276	Camelina	Camelina sativa	60
Avocado	Persea americana	270	Mustard	Brassica alba	59
Brazil Nut	Bertholletia excelsa	245	Coriander	Coriandrum sativum	55
Macadamia Nut	Macadamia terniflora	230	Pumpkin Seed	Cucurbita pepo	55
Jatropa	Jatropha curcas	194	Euphorbia	Euphorbia lagascae	54
Babassu Palm	Orbignya martiana	188	Hazelnut	Corylus avellana	49
Jojoba	Simmondsia chinensis	186	Linseed	Linum usitatissimum	49
Pecan	Carya illinoensis	183	Coffee	Coffea arabica	47
Bacuri	Platonia insignis	146	Soybean	Glycine max	46
Castor Bean	Ricinus communis	145	Hemp	Cannabis sativa	37
Gopher Plant	Euphorbia lathyris	137	Cotton	Gossypium hirsutum	33
Piassava	Attalea funifera	136	Calendula	Calendula officinalis	31
Olive Tree	Olea europaea	124	Kenaf	Hibiscus cannabinus L.	28
Rapeseed	Brassica napus	122	Rubber Seed	Hevea brasiliensis	26
Opium Poppy	Papaver somniferum	119	Lupine	Lupinus albus	24
Peanut	Ariachis hypogaea	109	Palm	Erythea salvadorensis	23
Cocoa	Theobroma cacao	105	Oat	Avena sativa	22
Sunflower	Helianthus annuus	98	Cashew Nut	Anacardium occidentale	18
Tung Oil Tree	Aleurites fordii	96	Corn	Zea mays	18

Source:
Amanda Hill, Al Kurki, and Mike Morris. 2010. “Biodiesel: The Sustainability Dimensions.” ATTRA Publication. Butte, MT: National Center for Appropriate Technology. Pages 4-5.
http://www.attra.org/attra-pub/biodiesel_sustainable.html

Camelina can be grown under marginal conditions with little moisture. It is an excellect rotational crop that is generally grown in the summer. Because camelina is high in omega-3 fatty acids, it is often used for edible oil applications, but can also be used for fuel purposes.

Section: FEEDSTOCKS
Camelina: Area, Yield, and Value in Montana

Year	Acreage		Production		Value	
	Planted	Harvested	Yield Per Acre (Pounds)	Total (Thousand Pounds)	Price Per CWT (Dollars)	Value of Production (Thousand Dollars)
2007	22,500	20,400	598	12,197	9.18	1,112
2008	12,200	9,100	569	5,182	n/a	n/a
2009	20,800	19,500	615	11,998	n/a	n/a
2010	9,900	9,400	1,010	9,465	n/a	n/a

Source:
U.S. Department of Agriculture, website accessed Sept 2011.
http://www.nass.usda.gov/Statistics_by_State/Montana/Publications/crops/camelayp.htm

Section: FEEDSTOCKS
Cotton: Area, Yield, Production, and Value, 1996-2009

Year	Area		Yield per harvested acre	Production	Marketing year average price per pound received by farmers	Value of production
	Planted	Harvested				
	1,000 Acres	1,000 Acres	Pounds	1,000 bales[a]	Cents	1,000 Dollars
1996	14,652.5	12,888.1	705	18,942.0	70.50	6,408,144
1997	13,898.0	13,406.0	673	18,793.0	66.20	5,975,585
1998	13,392.5	10,683.6	625	13,918.2	61.70	4,119,911
1999	14,873.5	13,424.9	607	16,968.0	46.80	3,809,560
2000	15,517.2	13,053.0	632	17,188.3	51.60	4,260,417
2001	15,768.5	13,827.7	705	20,302.8	32.00	3,121,848
2002	13,957.9	12,416.6	665	17,208.6	45.70	3,777,132
2003	13,479.6	12,003.4	730	18,255.2	63.00	5,516,761
2004	13,658.6	13,057.0	855	23,250.7	44.70	4,993,565
2005	14,245.4	13,802.6	831	23,890.2	49.70	5,695,217
2006	15,274.0	12,731.5	814	21,587.8	48.40	5,013,238
2007	10,827.2	10,489.1	879	19,206.9	61.30	5,652,907
2008	9,471.0	7,568.7	813	12,815.3	49.10	3,021,485
2009[b]	9,149.2	7,690.5	774	12,401.3	62.80	3,735,564

Source: U.S. Department of Agriculture, *2010 Agricultural Statistics*, Table 2-1 and previous annual editions,
http://www.nass.usda.gov/Publications/Ag_Statistics/index.asp

[a]480 pound net weight bales
[b] Preliminary.

Section: FEEDSTOCKS
Cotton: Area, Yield, and Production by State, Crop of 2007, 2008, and 2009

State and cotton classification	Area Planted			Area Harvested			Yield per Harvested Acre			Production[a]		
	2007	2008	2009[b]	2007	2008	2009[b]	2007	2008	2009[b]	2007	2008	2009[b]
Upland:	1,000 Acres	1,000 Acres	1,000 Acres	1,000 Acres	1,000 Acres	1,000 Acres	Pounds	Pounds	Pounds	1,000 bales[c]	1,000 bales[c]	1,000 bales[c]
Alabama	400.0	290.0	255.0	385.0	286.0	250.0	519	787	691	416.0	469.0	360.0
Arizona	170.0	135.0	145.0	168.0	133.0	144.0	1,469	1,462	1,467	514.0	405.0	440.0
Arkansas	860.0	620.0	520.0	850.0	615.0	500.0	1,071	1,012	797	1,896.0	1,296.0	830.0
California	195.0	120.0	71.0	194.0	117.0	70.0	1,608	1,506	1,714	650.0	367.0	250.0
Florida	85.0	67.0	82.0	81.0	65.0	78.0	687	916	646	116.0	124.0	105.0
Georgia	1,030.0	940.0	1,000.0	995.0	920.0	990.0	801	835	882	1,660.0	1,600.0	1,820.0
Kansas	47.0	35.0	38.0	43.0	25.0	34.0	639	653	720	57.2	34.0	51.0
Louisiana	335.0	300.0	230.0	330.0	234.0	225.0	1,017	576	725	699.0	281.0	340.0
Mississippi	660.0	365.0	305.0	655.0	360.0	295.0	966	911	692	1,318.0	683.0	425.0
Missouri	380.0	306.0	272.0	379.0	303.0	260.0	968	1,106	960	764.0	698.0	520.0
New Mexico	43.0	38.0	30.5	39.0	35.0	29.0	1,095	974	828	89.0	71.0	50.0
North Carolina	500.0	430.0	375.0	490.0	428.0	370.0	767	847	986	783.0	755.0	760.0
Oklahoma	175.0	170.0	205.0	165.0	155.0	200.0	817	811	792	281.0	262.0	330.0
South Carolina	180.0	135.0	115.0	158.0	134.0	114.0	486	881	842	160.0	246.0	200.0
Tennessee	515.0	285.0	300.0	510.0	280.0	280.0	565	909	857	600.0	530.0	500.0
Texas	4,900.0	5,000.0	5,000.0	4,700.0	3,250.0	3,650.0	843	657	644	8,250.0	4,450.0	4,900.0
Virginia	60.0	61.0	64.0	59.0	60.0	63.0	829	908	990	101.9	113.5	130.0
Total	**10,535.0**	**9,297.0**	**9,007.5**	**10,201.0**	**7,400.0**	**7,552.0**	**864**	**803**	**763**	**18,355.1**	**12,384.5**	**12,011.0**
American-Pima:												
Arizona	2.5	0.8	1.7	2.5	0.8	1.7	883	480	1,129	4.6	0.8	4.0
California	260.0	155.0	119.0	257.0	151.0	116.0	1,481	1,281	1,448	793.0	403.0	350.0
New Mexico	4.7	2.6	3.0	4.6	1.9	3.0	856	758	688	8.2	3.0	4.3
Texas	25.0	15.6	18.0	24.0	15.0	17.8	920	768	863	46.0	24.0	32.0
Total	292.2	174.0	141.7	288.1	168.7	138.5	1,419	1,226	1,353	851.8	430.8	390.3
U.S. Total	**10,827.2**	**9,471.0**	**9,149.2**	**10,489.1**	**7,568.7**	**7,690.5**	**879**	**813**	**774**	**19,206.9**	**12,401.3**	**12,401.3**

Source: U.S. Department of Agriculture, *2010 Agricultural Statistics,* Table 2-2, http://www.nass.usda.gov/Publications/Ag_Statistics/index.asp

Notes:
[a] Production ginned and to be ginned.
[b] Preliminary
[c] 480-pound net weight bale.

Section: FEEDSTOCKS

Cotton Production Costs and Returns per Planted Acre by Region, Excluding Government Payments, 2009-2010[a]

(dollars per planted acre)

Item	United States		Heartland		Prarie Gateway		Southern Seaboard		Fruitful Rim		Mississippi Portal	
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
Gross value of production												
Primary product: Cotton	365.58	620.65	478.44	795.75	268.80	550.63	495.60	603.20	604.35	1058.81	410.85	715.92
Secondary product: Cottonseed	80.20	99.15	114.64	154.44	62.16	90.16	80.16	85.40	123.80	166.76	96.64	121.92
Total, gross value of production	**445.78**	**719.80**	**593.08**	**950.19**	**330.96**	**640.79**	**575.76**	**688.60**	**728.15**	**1225.57**	**507.49**	**837.84**
Operating costs:												
Seed	73.52	81.38	121.43	132.85	56.91	62.27	82.56	90.32	76.16	83.32	103.56	113.30
Fertilizer [b]	92.29	73.54	116.96	89.98	53.70	41.32	145.23	111.73	121.56	93.52	124.15	95.51
Chemicals	67.97	68.35	90.29	88.65	42.68	41.90	91.42	89.76	98.98	97.17	105.66	103.74
Custom operations	22.11	22.86	14.18	14.36	13.97	14.15	22.97	23.26	62.71	63.50	29.18	29.54
Fuel, lube, and electricity	40.15	50.81	40.72	51.85	41.47	53.49	34.17	41.83	75.05	95.31	30.66	39.25
Repairs	33.74	34.42	43.35	44.18	31.58	32.18	33.94	34.59	36.57	37.27	39.57	40.32
Ginning	101.64	127.64	135.53	164.34	79.38	116.72	113.81	105.19	188.63	225.62	119.63	152.76
Purchased irrigation water	2.86	3.03	0.00	0.00	0.00	0.00	0.00	0.00	36.58	37.04	0.00	0.00
Interest on operating capital	0.63	0.46	0.82	0.59	0.46	0.36	0.76	0.50	1.01	0.73	0.80	0.57
Total, operating costs	434.91	462.49	563.28	586.80	320.15	362.39	524.86	497.18	697.25	733.48	553.21	574.99
Allocated overhead:												
Hired labor	14.26	14.50	17.54	17.73	11.94	12.07	13.46	13.60	27.43	27.72	16.63	16.81
Opportunity cost of unpaid labor	26.11	26.10	27.44	27.73	29.20	29.51	20.70	20.92	32.81	33.17	20.41	20.63
Capital recovery of machinery and equipment	128.49	132.32	176.89	181.67	117.18	120.35	129.34	132.84	149.18	153.21	149.51	153.55
Opportunity cost of land (rental rate)	67.18	70.79	101.85	104.87	40.50	41.71	82.48	84.93	115.32	118.74	103.80	106.88
Taxes and insurance	7.43	7.60	6.82	6.92	6.30	6.40	7.78	7.90	10.20	10.35	9.50	9.64
General farm overhead	15.62	16.16	13.80	14.07	12.12	12.35	18.24	18.59	27.04	27.55	19.20	19.57
Total, allocated overhead	259.09	267.47	344.34	352.99	217.24	222.39	272.00	278.78	361.98	370.74	319.05	327.08
Total costs listed	**694.00**	**729.96**	**907.62**	**939.79**	**537.39**	**584.78**	**796.86**	**775.96**	**1,059.23**	**1,104.22**	**872.26**	**902.07**
Value of production less total costs listed	-248.22	-10.16	-314.54	10.40	-206.43	56.01	-221.10	-87.36	-331.08	121.35	-364.77	-64.23
Value of production less operating costs	10.87	257.31	29.80	363.39	10.81	278.40	50.90	191.42	30.90	492.09	-45.72	262.85
Supporting information:												
Cotton Yield (pounds per planted acre)	620	766	886	1061	480	697	826	754	765	937	747	942
Price (dollars per pound)	0.59	0.81	0.54	0.75	0.56	0.79	0.6	0.8	0.79	1.13	0.55	0.76
Cottonseed Yield (pounds per planted acre)	1,003	1,239	1,433	1,716	777	1,127	1,336	1,220	1,238	1,516	1,208	1,524
Price (dollars per pound)	0.08	0.08	0.08	0.09	0.08	0.08	0.06	0.07	0.10	0.11	0.08	0.08
Enterprise size (planted acres)[a]	687	687	861	861	770	770	453	453	507	507	954	954
Production practices:[a]												
Irrigated (percent)	43	43	61	61	46	46	28	28	57	57	45	45
Dryland (percent)	57	57	39	39	54	54	72	72	43	43	55	55

Source:
Economic Research Service, U.S. Department of Agriculture,
http://www.ers.usda.gov/data/costsandreturns/testpick.htm

[a]Developed from survey base year, 2007.

[b]Commercial fertilizer, soil conditioners, and manure.

USDA's 2008 soybean baseline projections do not specifically show oil produced for use as a biofuel and do not reflect in the projections the probable increase in demand for soybean oil as a biofuel which is anticipated due to the Energy Policy Act of 2005. It is likely that future USDA soybean baseline projections will reflect the market changes.

Section: FEEDSTOCKS
Soybeans and Products Baseline Projections, 2008-2021

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	2020/21
Area (million acres):													
Planted	75.7	77.5	77.7	78.0	78.3	78.5	79.0	79.0	79.5	79.5	79.5	79.5	79.5
Harvested	74.7	76.4	76.8	77.1	77.3	77.6	78.1	78.1	78.5	78.5	78.5	78.5	78.5
Yield/harvested acre (bushels)	39.7	44.0	43.9	43.5	44.0	44.4	44.9	45.3	45.8	46.2	46.7	47.1	47.6
Supply (million bushels)													
Beginning stocks, Sept 1	205	138	151	185	190	195	194	197	199	196	197	198	199
Production	2,967	3,359	3,375	3,355	3,395	3,445	3,505	3,540	3,590	3,625	3,660	3,695	3,735
Imports	13	15	10	10	10	10	10	10	10	10	10	10	10
Total supply	3,185	3,512	3,536	3,550	3,595	3,650	3,709	3,747	3,799	3,831	3,867	3,903	3,945
Disposition (million bushels)													
Crush	1,662	1,752	1,665	1,660	1,670	1,695	1,715	1,735	1,770	1,790	1,810	1,830	1,850
Seed and residual	101	108	117	125	125	126	127	128	128	129	129	129	130
Exports	1,283	1,501	1,570	1,575	1,605	1,635	1,670	1,685	1,705	1,715	1,730	1,745	1,765
Total disposition	3,047	3,361	3,351	3,360	3,400	3,456	3,512	3,548	3,603	3,634	3,669	3,704	3,745
Carryover stocks, August 31													
Total ending stocks	138	151	185	190	195	194	197	199	196	197	198	199	200
Stocks/use ratio, percent	4.5	4.5	5.5	5.7	5.7	5.6	5.6	5.6	5.4	5.4	5.4	5.4	5.3
Prices (dollars per bushel)													
Soybean price, farm	9.97	9.59	11.45	11.20	10.55	10.25	10.20	10.25	10.25	10.30	10.30	10.35	10.35
Variable costs of production (dollars):													
Per acre	127.06	132	131	136	139	140	142	144	146	148	150	152	154
Per bushel	3.20	3.01	2.98	3.13	3.15	3.16	3.17	3.18	3.19	3.20	3.22	3.23	3.24
Returns over variable costs (dollars per acre):													
Net returns	269	290	372	351	325	315	315	320	323	328	330	335	338
Soybean oil (million pounds)													
Beginning stocks, Oct. 1	2,485	2,861	3,358	2,653	2,368	2,073	2,093	2,143	2,123	2,208	2,223	2,198	2,128
Production	18,753	19,615	18,980	18,940	19,070	19,375	19,620	19,865	20,285	20,530	20,780	21,025	21,275
Imports	90	105	115	125	135	145	155	165	175	185	195	205	215
Total supply	21,328	22,581	22,453	21,718	21,573	21,593	21,868	22,173	22,583	22,923	23,198	23,428	23,618
Domestic disappearance	16,339	15,822	17,100	17,400	18,000	18,200	18,425	18,650	18,875	19,125	19,375	19,625	19,875
For methyl ester [a]	1,904	1,682	2,900	3,100	3,500	3,500	3,500	3,500	3,500	3,525	3,550	3,575	3,600
Exports	2,250	3,400	2,700	1,950	1,500	1,300	1,300	1,400	1,500	1,575	1,625	1,675	1,700
Total demand	18,589	19,222	19,800	19,350	19,500	19,500	19,725	20,050	20,375	20,700	21,000	21,300	21,575
Ending stocks, Sept. 30	2,739	3,358	2,653	2,368	2,073	2,093	2,143	2,123	2,208	2,223	2,198	2,128	2,043
Soybean oil price ($/lb)	0.3216	0.3567	0.445	0.455	0.455	0.455	0.460	0.460	0.460	0.463	0.465	0.468	0.470
Soybean meal (thousand short tons)													
Beginning stocks, Oct. 1	294	235	303	300	300	300	300	300	300	300	300	300	300
Production	39,112	41,702	39,532	39,435	39,685	40,235	40,685	41,235	41,985	42,485	42,985	43,485	43,985
Imports	90	150	165	165	165	165	165	165	165	165	165	165	165
Total supply	39,496	42,087	40,000	39,900	40,150	40,700	41,150	41,700	42,450	42,950	43,450	43,950	44,450
Domestic disappearance	30,757	30,634	30,600	31,000	31,250	31,700	32,150	32,650	33,150	33,650	34,150	34,650	35,150
Exports	8,500	11,150	9,100	8,600	8,600	8,700	8,700	8,750	9,000	9,000	9,000	9,000	9,000
Total demand	39,257	41,784	39,700	39,600	39,850	40,400	40,850	41,400	42,150	42,650	43,150	43,650	44,150
Ending stocks, Sept. 30	239	303	300	300	300	300	300	300	300	300	300	300	300
Soybean meal price ($/ton)	331.17	311.27	330.00	312.50	286.00	275.00	271.00	273.50	273.50	275.00	274.00	275.00	275.00
Crushing yields (pounds per bushel)													
Soybean oil	11.28	11.20	11.40	11.41	11.42	11.43	11.44	11.45	11.46	11.47	11.48	11.49	11.50
Soybean meal	47.08	47.60	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50
Crush margin ($ per bushel)	1.45	1.81	1.46	1.41	1.44	1.48	1.50	1.51	1.52	1.54	1.55	1.55	1.59

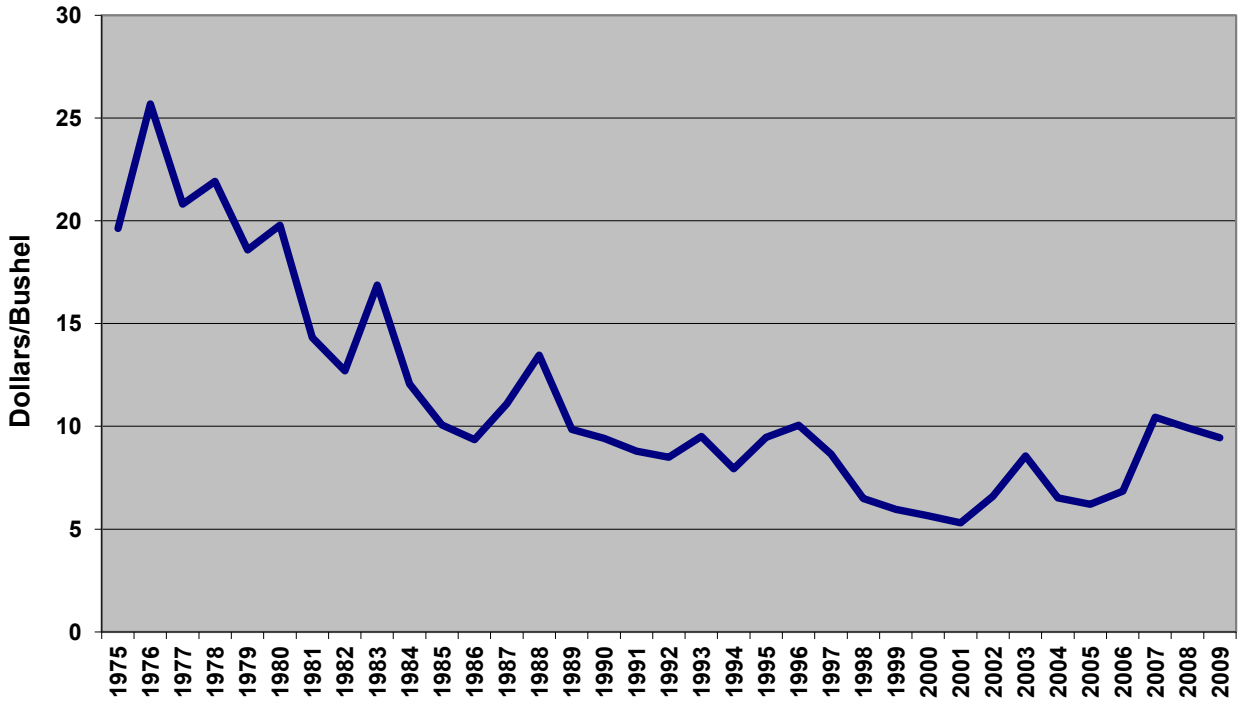
Source:
U.S.Department of Agriculture, *USDA Agricultural Projections to 2020* , February 2011, Table 24 - U.S. soybean and products, long term projections
http://usda.mannlib.cornell.edu/MannUsda/viewStaticPage.do?url=http://usda.mannlib.cornell.edu/usda/ers/94005/./2011/index.html

[a] Soybean oil used for methyl ester for production of biodiesel, history from the U.S. Department of Commerce.

Note:
Marketing year beginning September 1 for soybeans; October 1 for soybean oil and soybean meal.

The price for soybeans has declined since the mid 70s but has shown a modest increase since reaching a low of about five dollars a bushel in 2001.

Section: FEEDSTOCKS
Soybeans: Price per Bushel, 1975-2009
(constant 2009 dollars)



Source:
U.S. Department of Agriculture, National Agricultural Statistics Service
http://www.nass.usda.gov/

Section: FEEDSTOCKS
Soybeans: Area, Yield, Production, and Value, 1996-2009

Year	Area Planted	Soybeans for beans				
		Area harvested	Yield per acre	Production	Marketing year average price per bushel raised by farmers	Value of production
	1,000 Acres	1,000 Acres	Bushels	1,000 Bushels	Dollars	1,000 Dollars
1996	64,195	63,349	37.6	2,380,274	7.35	17,439,971
1997	70,005	69,110	38.9	2,688,750	6.47	17,372,628
1998	72,025	70,441	38.9	2,741,014	4.93	13,493,891
1999	73,730	72,446	36.6	2,653,758	4.63	12,205,352
2000	74,266	72,408	38.1	2,757,810	4.54	12,466,572
2001	74,075	72,975	39.6	2,890,682	4.38	12,605,717
2002	73,963	72,497	38.0	2,756,147	5.53	15,252,691
2003	73,404	72,476	33.9	2,453,845	7.34	18,015,097
2004	75,208	73,958	42.2	3,123,790	5.74	17,895,510
2005	72,032	71,251	43.1	3,068,342	5.66	17,297,137
2006	75,522	74,602	42.9	3,196,726	6.43	20,468,267
2007	64,741	64,146	41.7	2,677,117	10.10	26,974,406
2008	75,718	74,681	39.7	2,967,007	9.97	29,458,225
2009	77,451	76,372	44.0	3,359,011	9.45	31,760,452

Source:
U.S. Department of Agriculture, 2*010 Agricultural Statistics*, Table 3-31,
http://www.nass.usda.gov/Publications/Ag_Statistics/index.asp

Soybean production is highly variable by state, with the Mid-west producing the largest amount. States with the highest production levels are Illinois and Iowa.

Section: FEEDSTOCKS
Soybeans: Area, Yield, and Production, by State, 2007-2009

State	Area planted			Soybeans for beans								
				Area harvested			Yield per harvested acre			Production		
	2007	2008	2009	2007	2008	2009	2007	2008	2009	2007	2008	2009
	1,000 Acres	1,000 Acres	1,000 Acres	1,000 Acres	1,000 Acres	1,000 Acres	Bushels	Bushels	Bushels	1,000 Bushels	1,000 Bushels	1,000 Bushels
Alabama	190	360	440	185	350	430	21.0	35.0	40.0	3,885	12,250	17,200
Arizona	2,850	3,300	3,420	2,820	3,250	3,270	36.0	38.0	37.5	101,520	123,500	122,625
Delaware	160	195	185	155	193	183	26.0	27.5	42.0	4,030	5,308	7,686
Florida	14	32	37	12	29	34	24.0	38.0	38.0	288	1,102	1,292
Georgia	295	430	470	285	415	440	30.0	31.0	36.0	8,550	12,865	15,840
Illinois	8,300	9,200	9,400	8,280	9,120	9,350	43.5	47.0	46.0	360,180	428,640	430,100
Indiana	4,800	5,450	5,450	4,790	5,430	5,440	46.0	45.0	49.0	220,340	244,350	266,560
Iowa	8,650	9,750	9,600	8,630	9,670	9,530	52.0	46.5	51.0	448,760	449,655	486,030
Kansas	2,650	3,300	3,700	2,610	3,250	3,650	33.0	37.0	44.0	86,130	120,250	160,600
Kentucky	1,120	1,390	1,430	1,100	1,380	1,420	27.5	34.5	48.0	30,250	47,610	68,160
Louisiana	615	1,050	1,020	600	950	940	43.0	33.0	39.0	25,800	31,350	36,660
Maryland	405	495	485	390	485	475	27.5	30.0	42.0	10,725	14,550	19,950
Michigan	1,800	1,900	2,000	1,790	1,890	1,990	40.0	37.0	40.0	71,600	69,930	79,600
Minnesota	6,350	7,050	7,200	6,290	6,970	7,120	42.5	38.0	40.0	267,325	264,860	284,800
Mississippi	1,460	2,000	2,160	1,440	1,960	2,030	40.5	40.0	38.0	58,320	78,400	77,140
Missouri	4,700	5,200	5,350	4,670	5,030	5,300	37.5	38.0	43.5	175,125	191,140	230,550
Nebraska	3,870	4,900	4,800	3,850	4,860	4,760	51.0	46.5	54.5	196,350	225,990	259,420
New Jersey	82	92	89	80	90	87	31.0	30.0	42.0	2,480	2,700	3,654
New York	205	230	255	203	226	254	39.0	46.0	43.0	7,917	10,396	10,922
North Carolina	1,440	1,690	1,800	1,380	1,670	1,750	22.0	33.0	34.0	30,360	55,110	59,500
North Dakota	3,100	3,800	3,900	3,060	3,760	3,870	35.5	28.0	30.0	108,630	105,280	116,100
Ohio	4,250	4,500	4,550	4,240	4,480	4,530	47.0	36.0	49.0	199,280	161,280	221,970
Oklahoma	190	400	405	180	360	390	26.0	25.0	31.0	4,680	9,000	12,090
Pennsylvania	435	435	450	430	430	445	41.0	40.0	46.0	17,630	17,200	20,470
South Carolina	460	540	590	440	530	565	18.5	32.0	24.5	8,140	16,960	13,843
South Dakota	3,250	4,100	4,250	3,240	4,060	4,190	42.0	34.0	42.0	136,080	138,040	175,980
Tennessee	1,080	1,490	1,570	1,010	1,460	1,530	19.0	34.0	45.0	19,190	49,640	68,850
Texas	95	230	215	92	205	190	37.5	24.5	25.0	3,450	5,023	4,750
Virginia	510	580	580	500	570	570	27.5	32.0	37.0	13,750	18,240	21,090
West Virginia	15	19	20	14	18	19	33.0	41.0	41.0	462	738	779
Wisconsin	1,400	1,610	1,630	1,380	1,590	1,620	40.5	35.0	40.0	55,890	55,650	64,800
US	**64,741**	**75,718**	**77,451**	**64,146**	**74,681**	**76,372**	**41.7**	**39.7**	**44.0**	**2,677,117**	**2,967,007**	**3,359,011**

Source:
U.S.Department of Agriculture, *2010 Agricultural Statistics*, Table 3-36, and previous annual editions,
http://www.nass.usda.gov/Publications/Ag_Statistics/index.asp

In 2006, soybean stocks and production reached its greatest level during the period 1995-2008.

Section: FEEDSTOCKS
Soybeans: Supply and Disappearance, 1995-2008
(thousand bushels)

	Supply				
	Stocks by Position				
Year beginning September	Farm	Terminal market, interior mill, elevator, and warehouse	Total	Production	Total[a]
1995	105,130	229,684	334,814	2,174,254	2,513,524
1996	59,523	123,935	183,458	2,380,274	2,572,636
1997	43,600	88,233	131,833	2,688,750	2,825,589
1998	84,300	115,499	199,799	2,741,014	2,944,334
1999	145,000	203,482	348,482	2,653,758	3,006,411
2000	112,500	177,662	290,162	2,757,810	3,051,540
2001	83,500	164,247	247,747	2,890,682	3,140,749
2002	62,700	145,361	208,061	2,756,147	2,968,869
2003	58,000	120,329	178,329	2,453,665	2,637,773
2004	29,400	83,014	112,414	3,123,686	3,241,782
2005	99,700	156,038	255,738	3,063,237	3,327,452
2006	176,300	273,026	449,326	3,188,247	3,655,086
2007	143,000	430,810	573,810	2,677,117	3,260,798
2008[b]	47,000	158,034	205,034	2,967,007	3,185,314

Table continued

	Disappearance			
Year beginning September	Crushed[c]	Seed, feed and residual	Exports	Total
1995	1,369,541	111,441	849,084	2,330,066
1996	1,436,961	118,954	885,888	2,440,803
1997	1,596,980	154,476	874,334	2,625,790
1998	1,589,787	201,414	804,651	2,595,852
1999	1,577,650	165,194	973,405	2,716,249
2000	1,639,670	168,252	995,871	2,803,793
2001	1,699,741	169,296	1,063,651	2,932,688
2002	1,614,787	131,380	1,044,372	2,790,540
2003	1,529,699	109,072	886,551	2,525,322
2004	1,696,081	192,806	1,097,156	2,986,044
2005	1,738,852	199,396	939,879	2,878,126
2006	1,807,706	157,074	1,116,496	3,081,276
2007	1,803,407	93,445	1,158,829	3,055,764
2008[b]	1,661,987	101,849	1,283,269	3,047,106

Source:
U.S. Department of Agriculture, *2010 Agricultural Statistics*, Table 3-34, and previous annual editions, http://www.nass.usda.gov/Publications/Ag_Statistics/index.asp

[a] Includes imports.
[b] Preliminary.
[c] Reported by the U.S. Department of Commerce.

Prices for soybeans used for biodiesel production may vary for each mill depending on whether the mills are owned by farmers cooperatives or whether the soybeans are purchased on the open market. The average price per bushel rose sharply by nearly 4 dollars between 2006 and 2007 but then declined by 65 cents between 2007 and 2009.

Section: FEEDSTOCKS

Soybeans for Beans: Marketing Year Average Price and Value, by State, Crop of 2007, 2008, and 2009

State[a]	Marketing year average price per bushel			Value of production		
	2007	2008	2009[b]	2007	2008	2009[b]
	Dollars	Dollars	Dollars	1,000 Dollars	1,000 Dollars	1,000 Dollars
Alabama	11.40	10.30	10.40	44,289	126,175	178,880
Arkansas	9.02	9.64	9.60	915,710	1,190,540	1,177,200
Delaware	11.50	9.40	9.60	46,345	49,895	73,786
Florida	8.90	8.50	9.50	2,563	9,367	12,274
Georgia	11.90	9.50	9.50	101,745	122,218	153,900
Illinois	10.40	10.20	9.70	3,745,872	4,372,128	4,171,970
Indiana	10.20	10.20	9.55	2,247,468	2,492,370	2,545,648
Iowa	10.50	10.20	9.40	4,711,980	4,586,481	4,568,682
Kansas	10.10	9.39	9.25	869,913	1,129,148	1,485,550
Kentucky	10.10	10.00	9.65	305,525	476,100	657,744
Louisiana	8.43	9.52	9.60	217,494	298,452	351,936
Maryland	11.20	9.20	9.70	120,120	133,860	193,515
Michigan	9.69	9.82	9.40	693,804	686,713	748,240
Minnesota	10.20	10.10	9.30	2,726,715	2,675,086	2,648,640
Mississippi	8.36	9.29	9.15	487,555	728,336	705,831
Missouri	10.10	9.74	9.40	1,768,763	1,861,704	2,167,170
Nebraska	9.92	9.79	9.40	1,947,792	2,212,442	2,438,548
New Jersey	10.10	9.75	9.45	25,048	26,325	34,530
New York	11.20	10.30	8.95	88,670	107,079	97,752
North Carolina	10.10	9.33	9.50	306,636	514,176	571,710
North Dakota	9.63	9.71	9.25	1,046,107	1,022,269	1,073,925
Ohio	9.93	10.30	9.60	1,978,850	1,661,184	2,130,912
Oklahoma	10.00	9.10	9.35	46,800	81,900	113,042
Pennsylvania	10.70	10.20	9.35	188,641	175,440	191,395
South Carolina	10.90	9.00	9.75	88,726	152,640	138,938
South Dakota	9.60	9.65	9.05	1,306,368	1,332,086	1,592,619
Tennessee	10.30	9.45	9.65	197,657	469,098	664,403
Texas	10.40	9.25	9.25	35,880	46,463	43,938
Virginia	11.40	9.10	9.60	156,750	165,984	207,936
West Virginia	11.30	9.75	9.60	5,221	7,196	7,478
Wisconsin	9.83	9.80	9.45	549,399	545,370	612,360
US	**10.10**	**9.97**	**9.45**	**26,974,406**	**29,458,225**	**31,760,452**

Source: U.S. Department of Agriculture, *2010 Agricultural Statistics,* Table 3-38, http://www.nass.usda.gov/Publications/Ag_Statistics/index.asp

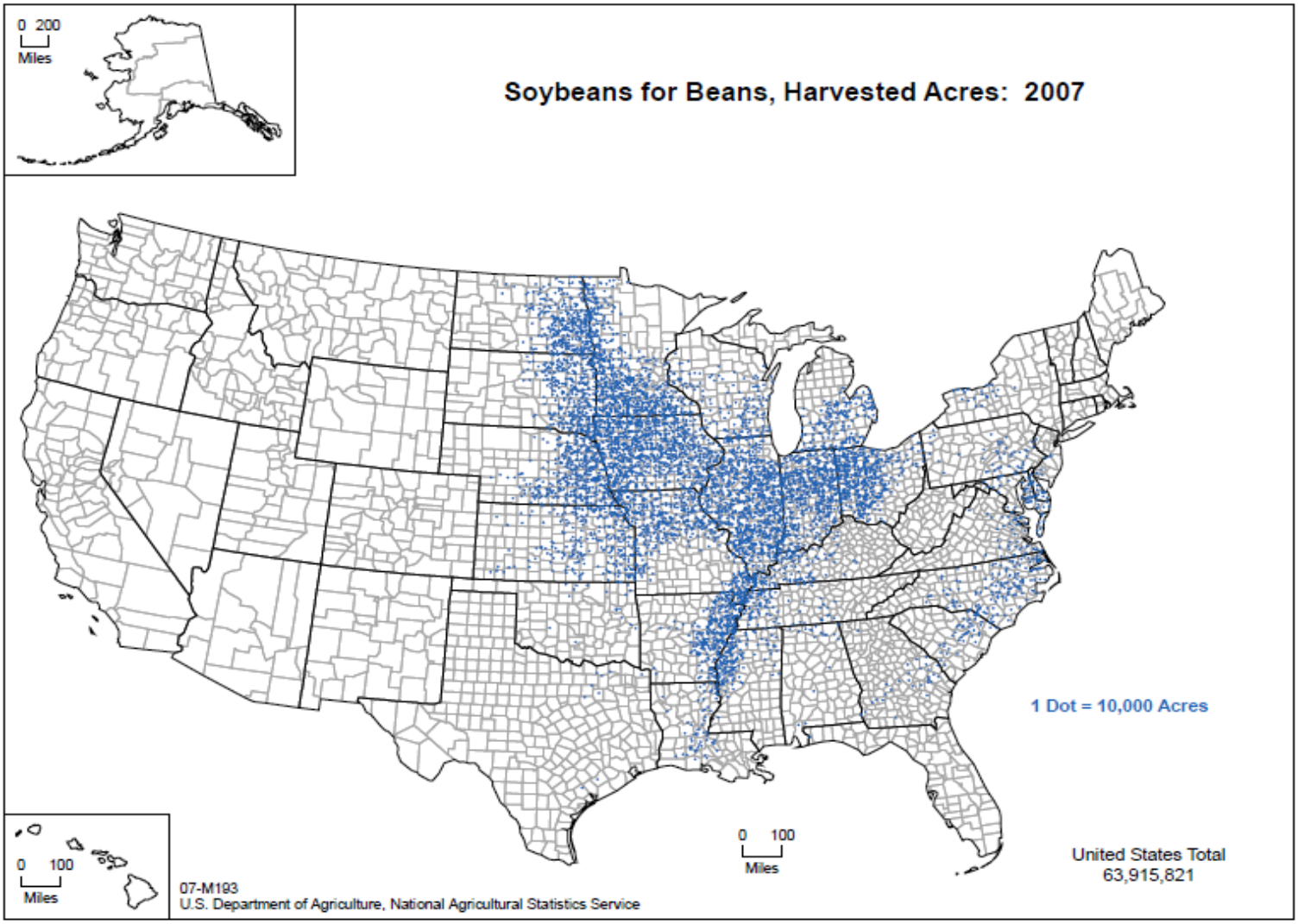
Notes:

[a] States with no data are not listed.

[b] Preliminary

Soybean production area is similar to corn production area, with the addition of more area in North and South Dakota and along the Mississippi Delta.

Section: FEEDSTOCKS
Soybeans for Beans, Harvested Acres in the United States, 2007



Source:
U.S. Department of Agriculture, National Agricultural Statistics Service, The Census of Agriculture
http://www.agcensus.usda.gov/Publications/2007/Online_Highlights/Ag_Atlas_Maps/Crops_and_Plants/

As with all agricultural crops, soybean costs and returns per acre vary by region. In general, soybean returns are a little less than returns for corn when only operating costs are considered.

Section: FEEDSTOCKS

Soybean Production Costs and Returns per Planted Acre by Region, Excluding Government Payments, 2009-2010[a]

(dollars per planted acre)

Item	United States		Heartland		Northern Crescent		Northern Great Plains		Prarie Gateway		Eastern Uplands		Southern Seaboard		Mississippi Portal	
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
Gross value of production																
Primary product: Soybeans	437.10	449.32	502.86	505.41	415.80	468.00	323.40	352.98	482.46	410.34	393.60	327.67	373.92	310.30	341.60	332.64
Total, gross value of production	**437.10**	**449.32**	**502.86**	**505.41**	**415.80**	**468.00**	**323.40**	**352.98**	**482.46**	**410.34**	**393.60**	**327.67**	**373.92**	**310.30**	**341.60**	**332.64**
Operating costs:																
Seed	55.26	59.20	53.50	57.49	57.94	62.26	57.43	61.71	51.29	55.11	52.55	56.46	50.52	54.29	54.47	58.53
Fertilizer[b]	23.65	17.87	22.01	16.88	33.93	26.02	10.64	8.15	13.19	10.12	36.51	27.99	60.11	46.09	22.48	17.24
Chemicals	17.38	17.04	16.87	16.64	16.33	16.11	14.63	14.43	15.18	14.98	13.48	13.30	18.48	18.23	21.79	21.49
Custom operations	7.17	6.52	6.03	5.50	9.35	8.52	5.78	5.27	8.80	8.02	8.28	7.55	6.11	5.57	10.47	9.54
Fuel, lube, and electricity	13.48	16.75	10.48	13.01	11.88	14.74	9.65	11.98	25.13	31.19	11.12	13.81	9.52	11.82	25.43	31.57
Repairs	13.22	13.46	11.47	11.69	11.40	11.62	13.29	13.54	18.24	18.59	11.37	11.59	10.42	10.62	19.37	19.74
Purchased irrigation water	0.14	0.14	0.00	0.00	0.00	0.00	0.00	0.00	1.76	1.61	0.00	0.00	0.00	0.00	0.00	0.00
Interest on operating capital	0.19	1.31	0.17	1.21	0.20	1.39	0.16	1.15	0.19	1.40	0.19	1.31	0.22	1.47	0.22	1.58
Total, operating costs	**130.49**	**132.29**	**120.53**	**122.42**	**141.03**	**140.66**	**111.58**	**116.23**	**133.78**	**141.02**	**133.50**	**132.01**	**155.38**	**148.09**	**154.23**	**159.69**
Allocated overhead:																
Hired labor	2.14	2.11	1.26	1.27	1.28	1.29	1.64	1.66	2.08	2.10	2.95	2.98	2.90	2.93	7.31	7.38
Opportunity cost of unpaid labor	17.19	17.33	15.67	15.84	18.27	18.47	14.45	14.60	20.81	21.03	18.19	18.38	19.06	19.26	19.83	20.04
Capital recovery of machinery and equipment	75.54	77.51	71.33	73.26	64.62	66.37	80.29	82.46	88.58	90.97	66.81	68.61	62.51	64.20	84.10	86.38
Opportunity cost of land (rental rate)	108.98	148.34	127.92	174.63	89.62	122.34	58.89	80.40	76.55	104.51	71.47	97.56	49.46	67.52	81.22	110.88
Taxes and insurance	10.84	9.41	10.68	9.29	13.43	11.68	9.26	8.06	10.77	9.37	8.28	7.20	9.18	7.99	10.08	8.77
General farm overhead	14.57	14.86	14.62	14.90	18.80	19.16	11.64	11.86	15.94	16.24	14.23	14.50	10.87	11.08	10.51	10.71
Total, allocated overhead	229.26	269.56	241.48	289.19	206.02	239.31	176.17	199.04	214.73	244.22	181.93	209.23	153.98	172.98	213.05	244.16
Total costs listed	**359.75**	**401.85**	**362.01**	**411.61**	**347.05**	**379.97**	**287.75**	**315.27**	**348.51**	**385.24**	**315.43**	**341.24**	**309.36**	**321.07**	**367.28**	**403.85**
Value of production less total costs listed	77.35	47.47	140.85	93.80	68.75	88.03	35.65	37.71	133.95	25.10	78.17	-13.57	64.56	-10.77	-25.68	-71.21
Value of production less operating costs	306.61	317.03	382.33	382.99	274.77	327.34	211.82	236.75	348.68	269.32	260.10	195.66	218.54	162.21	187.37	172.95
Supporting information:																
Yield (bushels per planted acre)	47	47	51	51	42	48	35	37	51	42	40	31	38	29	35	33
Price (dollars per bushel at harvest)	9.30	9.56	9.86	9.91	9.90	9.75	9.24	9.54	9.46	9.77	9.84	10.57	9.84	10.70	9.76	10.08
Enterprise size (planted acres)[a]	303	303	299	299	164	164	164	164	254	254	321	321	240	240	676	676
Production practices:[a]																
Irrigated (percent)	9	9	4	4	2	2	2	2	32	32	6	6	0	0	38	38
Dryland (percent)	91	91	96	96	98	98	98	98	68	68	94	94	100	100	62	62

Source:
Economic Research Service, U.S. Department of Agriculture,
http://www.ers.usda.gov/data/costsandreturns/testpick.htm

[a] Developed from survey base year, 2006.
[b] Commercial fertilizer, soil conditioners, and manure.

Using algae as a feedstock for biofuels has several advantages, according to the U.S. Department of Energy's National Algal Biofuels Technology Roadmap. One of those advantages is that algal production offers high yields per acre of cultivation compared to other feedstocks. Originating from several different sources of data, an estimated oil content of different algal species is shown below.

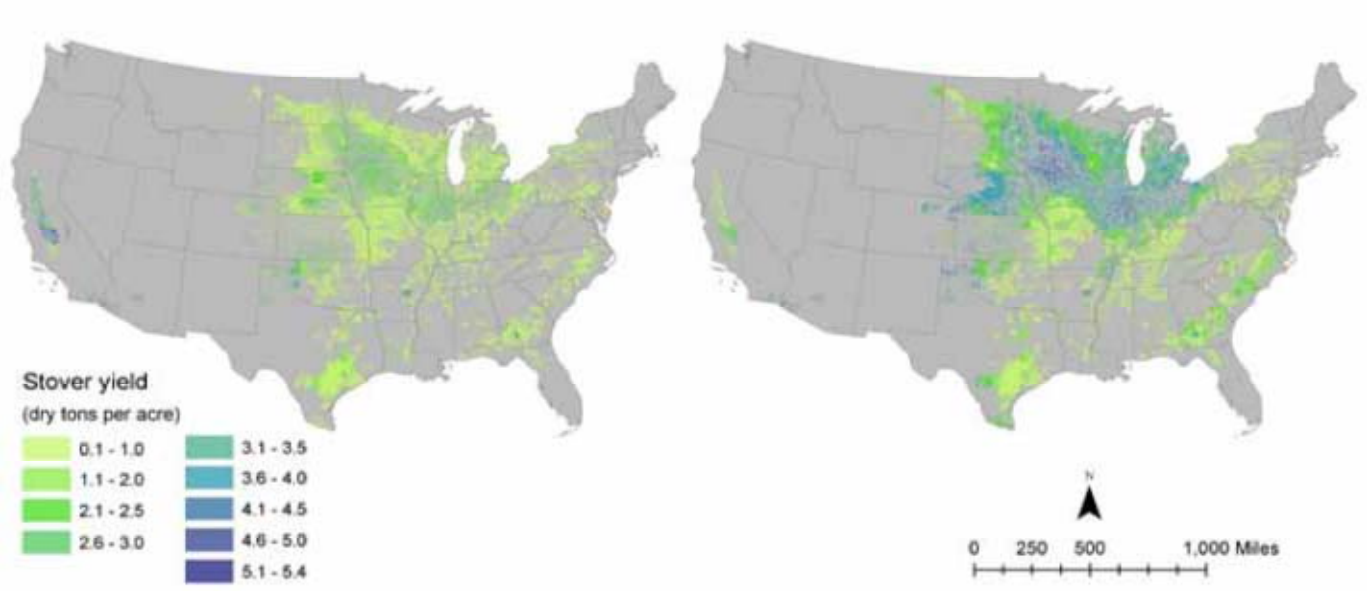
Section: FEEDSTOCKS
Oil Content in Selected Algal Species

Species	Oil Content (% dry weight)	Reference (cited after Carisson et al., 2007)
Ankistrodesmus TR-87	28-40	Ben-Amotz and Tornabene (1985)
Botryococcus braunii	29-75	Sheehan et al. (1998); Banerjee et al. (2002); Metzger & Largeau (2005)
Chlorella sp.	29	Sheehan et al. (1998)
Chlorella protothecoides (autotrophic/heterothrophic)	15-55	Xu et al. (2006)
Cyclotella DI-35	42	Sheehan et al. (1998)
Dunaliella tertiolecta	36-42	Kishimoto et al. (1994); Tsukahara & Sawayama (2005)
Hantzschia DI-160	66	Sheehan et al. (1998)
Isochrysis sp.	7-33	Sheehan et al. (1998); Valenzuela-Espinoza et al. (2002)
Nannochloris	31 (6-63)	Ben-Amotz & Tornabene (1985); Negoro et al. (1991); Sheehan et al. (1998)
Nannochloropsis	46 (31-68)	Sheehan et al. (1998); Hu et al. (2006)
Nitzschia TR-114	28-50	Kyle DJ, Gladue RM (1991) Patent Application, PCT WO 91/1447, 3 Oct 1991
Phaeodactylum tricornutum	31	Sheehan et al. (1998)
Scenedesmus TR-84	45	Sheehan et al. (1998)
Stichococcus	33 (9-59)	Sheehan et al. (1998)
Tetraselmis suecica	15-32	Sheehan et al. (1998); Zittelli et al. (2006); Christi (2007)
Thalassiosira pseudonana	(21-31)	Brown et al. (1996)
Crpythecodinium cohnii	20	www.oilgae.com
Neochloris oleoabundans	35-54	www.oilgae.com
Schisochytrium	50-77	www.oilgae.com

Source:
Oak Ridge National Laboratory, Reality of Algal Fuels, presentation by Tanya Kuritz, September 1, 2011.
http://www.ornl.gov/sci/ees/cbes/forums/Tanya%20Kuritz%20slides_Sep_1_11.pdf

Corn stover residue consists of the stalks, leaves, husks, and cobs left in the field after corn is harvested.

Section: FEEDSTOCKS
Corn Stover Residue Yield for Reduced Tillage and No-till Production, 2012

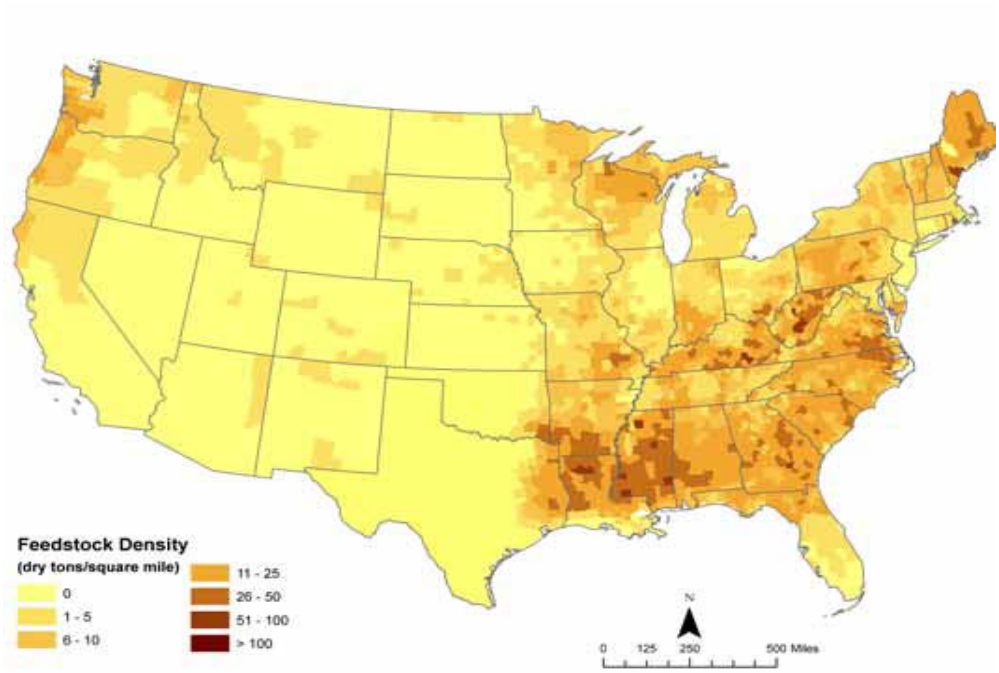


Source:

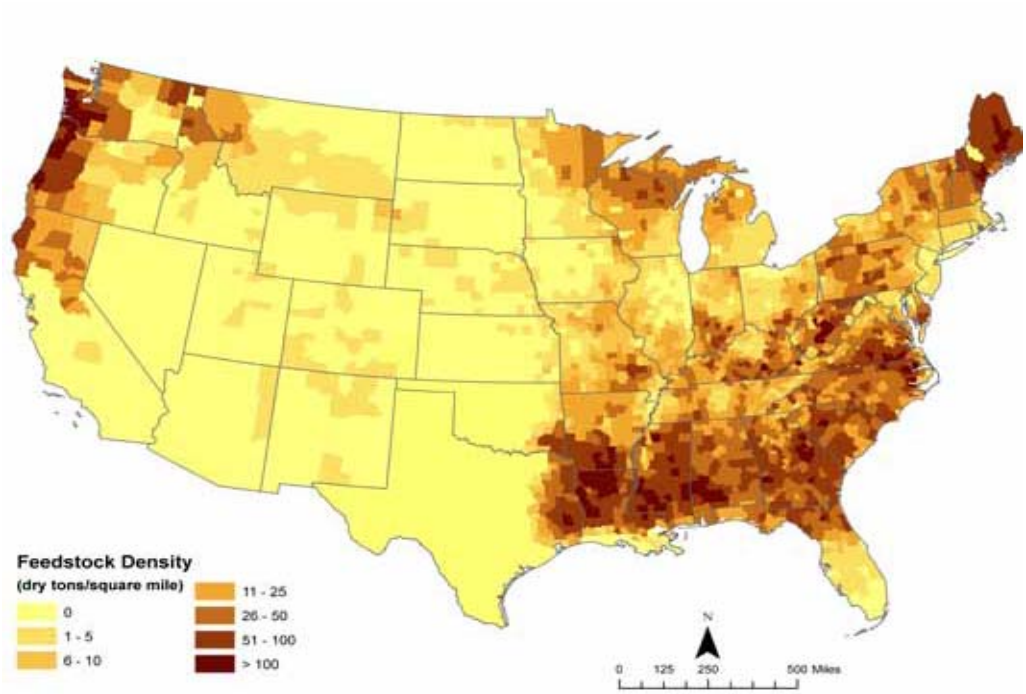
U.S. Department of Energy. 2011. *U.S. Billion-Ton Update*: *Biomass Supply for a Bioenergy and Bioproducts Industry*. R.D. Perlack and B.J. Stokes (Leads), ORNL/TM-2011/224. Oak Ridge National Laboratory, Oak Ridge, TN. 227p. http://www1.eere.energy.gov/biomass/pdfs/billion_ton_update.pdf

Logging residues are the unused portions of growing-stock and non-growing-stock trees cut or killed by logging and left in the woods.

Section: FEEDSTOCKS
Spatial Distribution of Logging Residues at $20 and $40 per Dry Ton Delivered to Roadside



$20 per dry ton

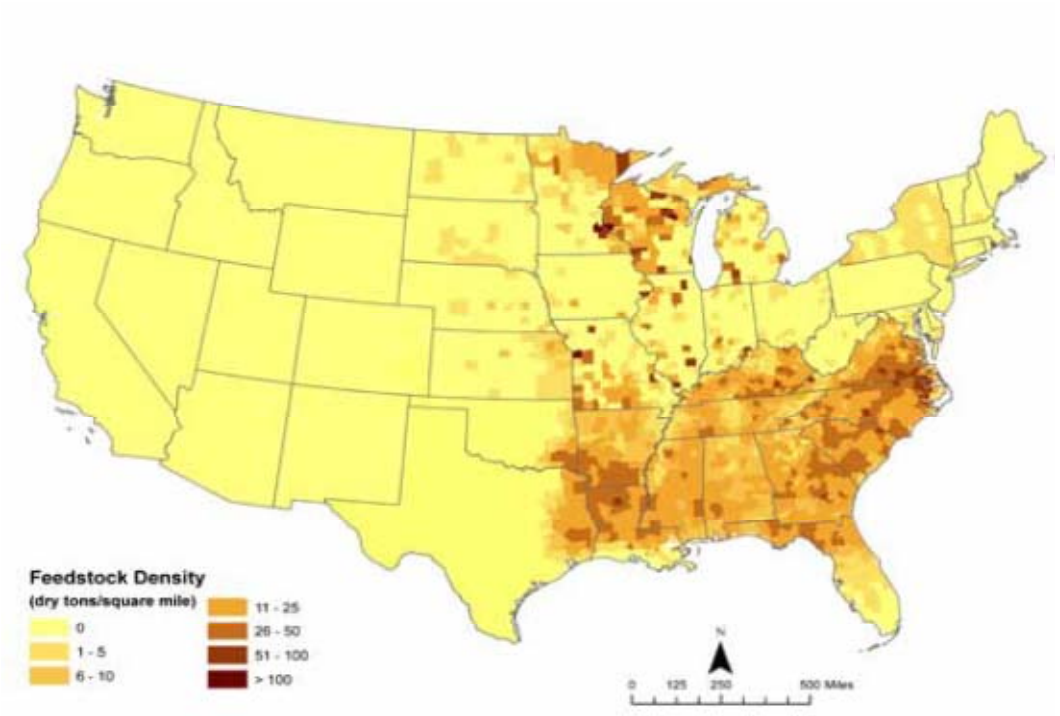


$40 per dry ton

Source:
U.S. Department of Energy. 2011. *U.S. Billion-Ton Update*: *Biomass Supply for a Bioenergy and Bioproducts Industry*. R.D. Perlack and B.J. Stokes (Leads), ORNL/TM-2011/224. Oak Ridge National Laboratory, Oak Ridge, TN. 227p. http://www1.eere.energy.gov/biomass/pdfs/billion_ton_update.pdf

Other removal residues are the unutilized wood volume cut or otherwise killed from timberland clearing or precommercial thinning operations. It does not include volume removed from inventory through reclassification of timberland to productive reserved forest land.

Section: FEEDSTOCKS
Spatial Availability of Other Removal Residues at $40 per Dry Ton (Delivered to Roadside)

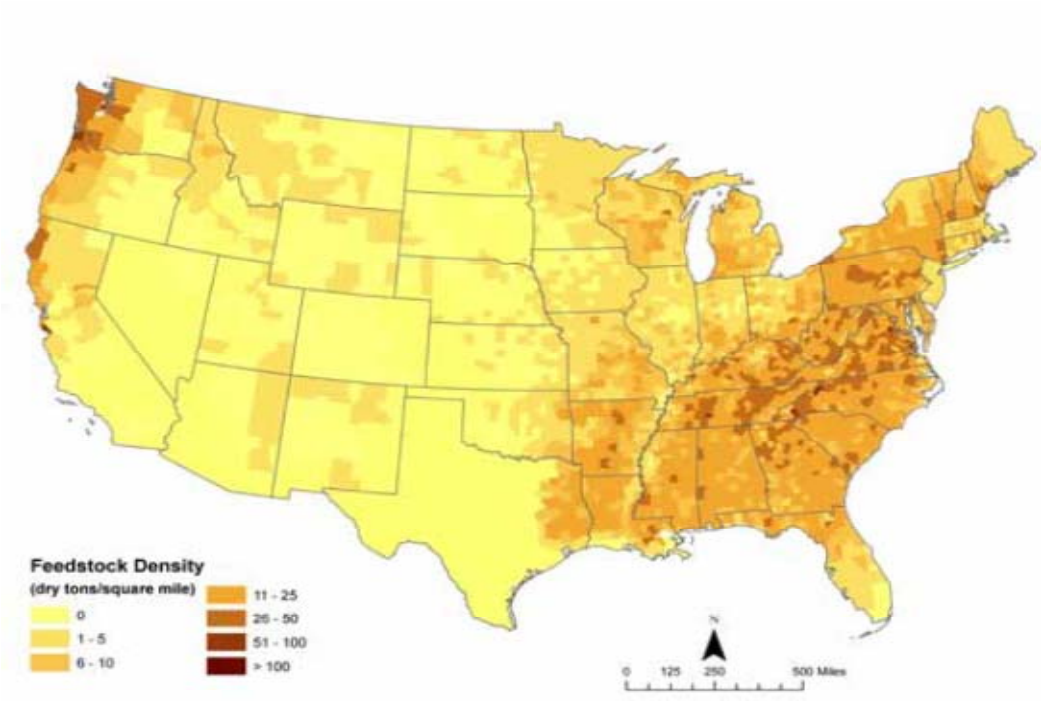


$40 per dry ton

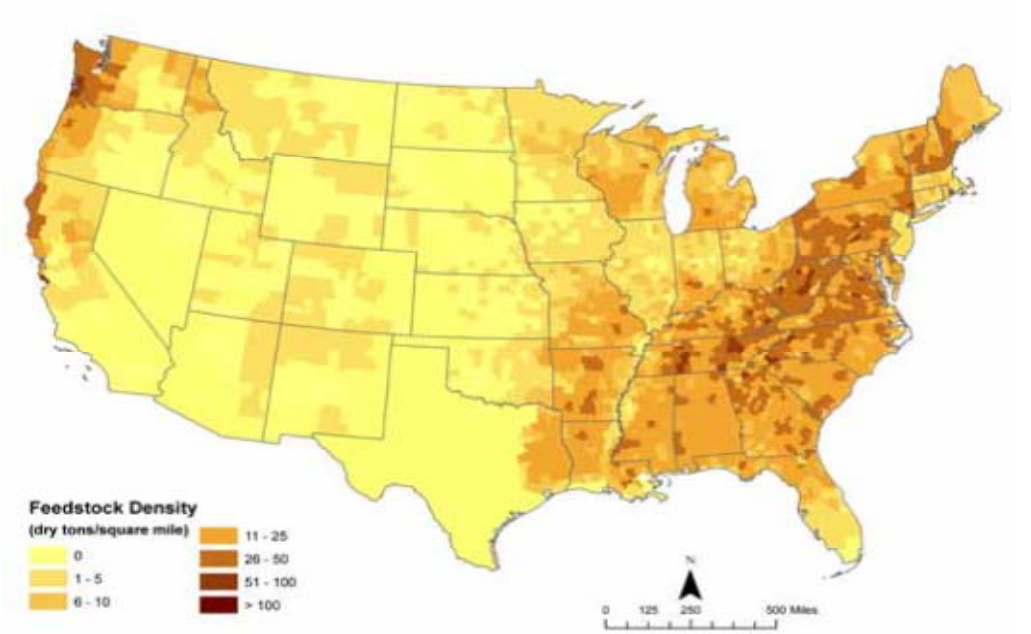
Source:
U.S. Department of Energy. 2011. *U.S. Billion-Ton Update* : *Biomass Supply for a Bioenergy and Bioproducts Industry* . R.D. Perlack and B.J. Stokes (Leads), ORNL/TM-2011/224. Oak Ridge National Laboratory, Oak Ridge, TN. 227p. http://www1.eere.energy.gov/biomass/pdfs/billion_ton_update.pdf

Forest residue thinnings are the material generated from thinnings designed to reduce the risk of loss to wildfire on timberlands. Timberland is forestland that is capable of producing in excess of 20 cubic feet per acre per year of industrial products in natural stands and is not withdrawn from timber utilization by statute or administrative regulation. These lands are distributed throughout the United States. As with logging residues, economics, site-specific characteristics and costs affect the recoverability of this material.

Section: FEEDSTOCKS
Spatial Distribution of Simulated Forest Residue Thinnings at $30 and $60 per Dry Ton (Roadside)



$30 per dry ton



$60 per dry ton

Source:

U.S. Department of Energy. 2011. *U.S. Billion-Ton Update*: *Biomass Supply for a Bioenergy and Bioproducts Industry*. R.D. Perlack and B.J. Stokes (Leads), ORNL/TM-2011/224. Oak Ridge National Laboratory, Oak Ridge, TN. 227p. http://www1.eere.energy.gov/biomass/pdfs/billion_ton_update.pdf

Secondary Biomass Feedstocks

Residues and byproduct streams from food, feed, fiber, wood, and materials processing plants are the main source of secondary biomass. Secondary biomass feedstocks differ from primary biomass feedstocks in that the secondary feedstocks are a by-product of processing of the primary feedstocks. By "processing" it is meant that there is substantial physical or chemical breakdown of the primary biomass and production of by-products. "Processors" may be factories or animals. Field processes such as harvesting, bundling, chipping or pressing do not cause a biomass resource that was produced by photosynthesis (e.g., tree tops and limbs) to be classified as secondary biomass.

Specific examples of secondary biomass includes sawdust from sawmills, black liquor (which is a by-product of paper making), and cheese whey (which is a by-product of cheese making processes). Manures from concentrated animal feeding operations are collectable secondary biomass resources. Vegetable oils used for biodiesel that are derived directly from the processing of oilseeds for various uses are also a secondary biomass resource.

It is difficult to find good direct sources of information on secondary biomass resources. In most cases, one has to estimate availability based on information and assumptions about the industries or companies generating the biomass. These estimates can be inaccurate because the amount of material that is a by-product to a given process can change over time as processes become more efficient or new uses are found for some by-product components.

The estimates provided in this Data Book were generated either by industries using secondary biomass to make a marketable fuel (e.g., the pellet fuel industry), or were generated by Forest Service staff using the Timber Product Output database, http://www.fia.fs.fed.us/tools-data/default.asp. This database is based on wood harvest and use inventories conducted every 5 years; the 2002 inventory is the latest source of information. The wood already used for energy provides insight on current bioenergy produced and the "unused" biomass represents wood that is already collected and potentially very easy to make available for additional energy production. Though a relatively small amount, it would likely be some of the first wood used if bioenergy use is accelerated in the U.S.

Information on black liquor production and use for energy is kept and tracked by the forest products industry but is proprietary. An estimate of black liquor production could be made based on publicly available information on pulp mills. However, any current listing of pulp mills in operation will be out-of-date within a month or two of publication because of the frequent closing of mills that is occurring. Thus, though a very important resource for bioenergy production today, no attempt is made to include a state level estimate of black liquor production in this book.

Source: Lynn Wright, Oak Ridge, TN.

The Forest Service's State and Private Forestry, Technology Marketing Unit, has awarded grants to stimulate utilization of woody biomass, especially of wood from areas needing hazardous fuels reduction. The projects are small and often support the purchase of equipment by small companies. The primary objective of the Forest Service is to increase the removal and use of small diameter wood from forests. Only 2009 and 2010 projects are shown in this summary.

Section: FEEDSTOCKS

U.S. Forest Service - Woody Biomass Utilization Grantees 2009 & 2010

Company Name	Location	Award (Dollars)
	2010 Grant Summary	
Headrick Logging	Anderson, CA	350,000
Sierra Resource Management	Jamestown, CA	329,000
Del Logging, Inc.	Bieber, CA	350,000
Cooley Forest Products	Phoenix, AZ	350,000
J. W. Bamford, Inc.	Oroville, CA	300,000
West Range Reclamation	Crawford, CO	350,000
Arizona Log and TimberWorks	Eagar, AZ	350,000
JL Shavings	Tularosa, NM	350,000
San Carlos Apache Timber Products	San Carlos, AZ	272,770
Warner Enterprises	Redding, CA	350,000
Foothills Firewood	Lyons, OR	325,014
Restoration Solutions	Corona, NM	350,000
ABCO Wood Recycling	Post Falls, ID	200,000

Table Continued on Next Page

Section: FEEDSTOCKS

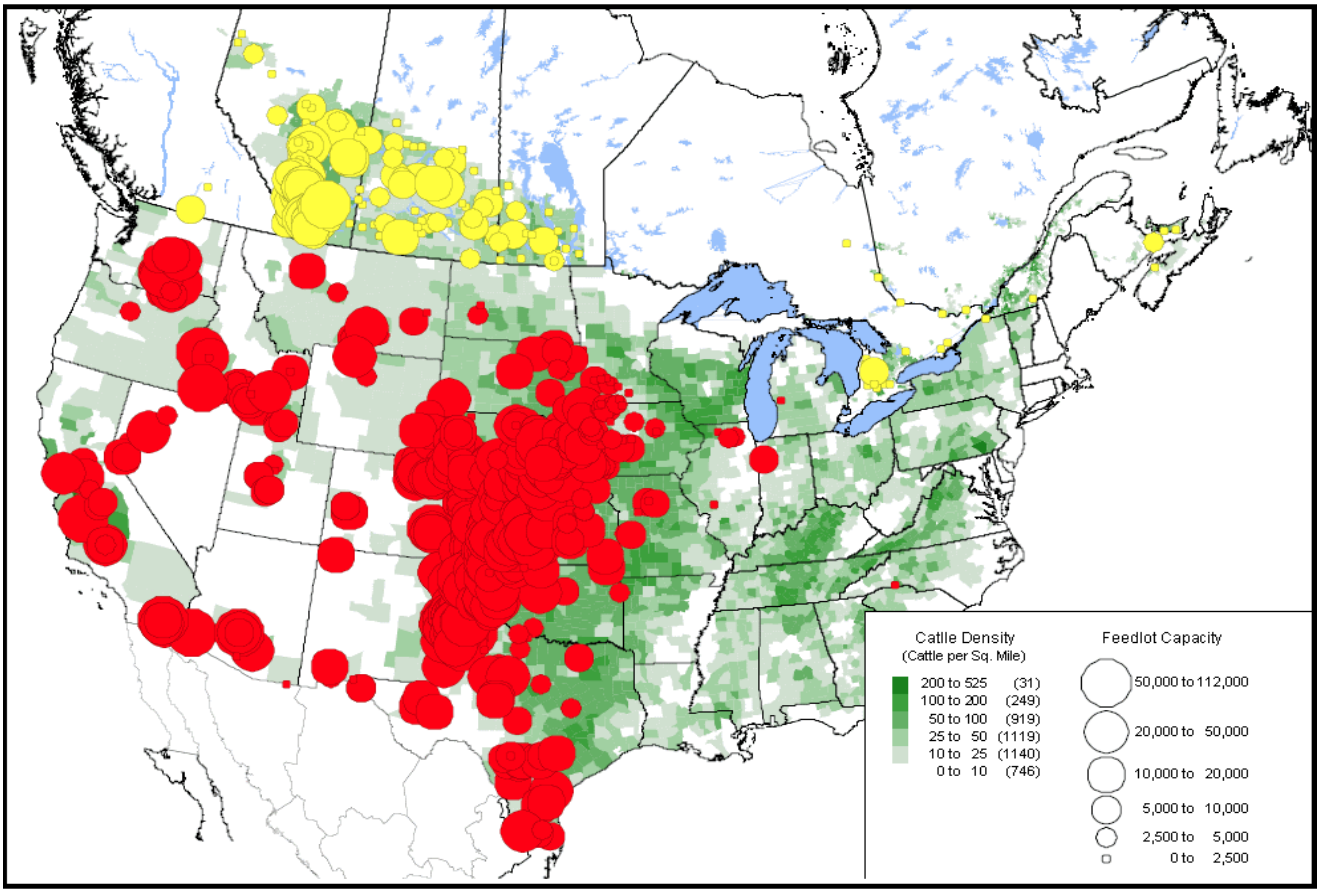
U.S. Forest Service - Woody Biomass Utilization Grantees 2009 & 2010 - Continued

Company Name	Location	Award (Dollars)
	2009 Grant Summary	
Rover Shavings & Post, Inc.	Rover, AR	250,000
Pure Wood Products, LLC	Pinetop, AZ	250,000
California Wood Shavings, Inc.	Jamestown, CA	249,550
CLT Logging, Inc.	Grenada, CA	250,000
Franklin Logging, Inc.	Bella Vista,CA	250,000
Scott Dunn Logging	Fortuna, CA	250,000
Trinity River Lumber Company	Weaverville, CA	250,000
Independent Log Company	Alamosa, CO	250,000
Intermountain Resources, LLC	Montrose, CO	250,000
Rogue Resources, Inc./More Lumber	Milner, CO	250,000
Idaho Forest Group, LLC	Athol, ID	250,000
Eagle Stud Mill, Inc.	Missoula, MT	250,000
Eureka Pellet Mills, Inc.	Missoula, MT	250,000
Southwest Piñon, Inc.	Datil, NM	250,000
Community Smallwood Solutions	Wallowa, OR	249,819
Marubeni Sustainable Energy	Lakeview, OR	250,000
Olson Brothers Enterprises, LLC	Crivitz, WI	250,000

Source: U.S. Forest Service State & Private Forestry Technology Marketing Unit website.
http://www.usda.gov/wps/portal/usda/usdahome?contentidonly=true&contentid=2010/06/0340.xml
http://www.wbi.wisc.edu/research/agriculture-secretary-vilsack-awards-more-than-42-million-for-woody-biomass-utilization-projects/

The map below showing feedlot capacity and distribution throughout the United States is important as an indication of manure availability.

Section: FEEDSTOCKS
Feedlot Capacity and Distribution, 2004



Source:
United States Department of Agriculture, U.S. Biobased Products Market Potential and Projections Through 2025. Page 224. OCE-2008-1, February 2008.
http://www.usda.gov/oce/energy/index.htm

The Forest Service classifies primary mill residues into three categories: bark, coarse residues (chunks and slabs) and fine residues (shavings and sawdust). These mill residues are excellent sources of biomass for cellulosic ethanol because they tend to be clean, uniform, concentrated, have low moisture content, and are already located at a processing facility. These traits make mill residues excellent feedstocks for energy and biomass needs as well.

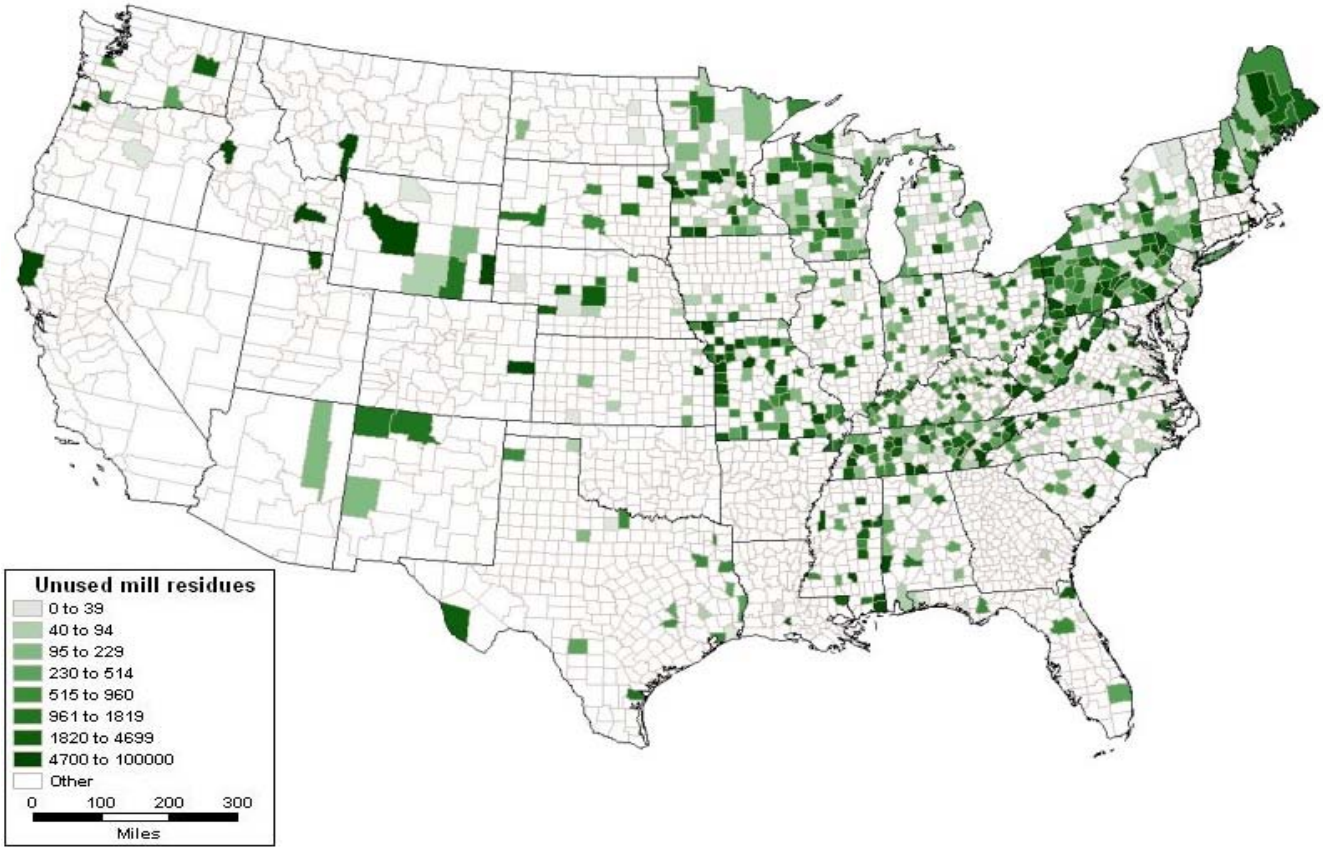
Section: FEEDSTOCKS
Primary Mill Residue Production and Use by State, 2007
(Dry tons)

State	Total residue produced	Fiber byproducts	Fuel byproducts	Miscellaneous byproducts	Unused mill residues
Alabama	6,770,270	2,319,180	3,990,970	453,010	7,120
Arizona	97,190	31,920	520	63,400	1,350
Arkansas	5,372,030	2,456,840	2,710,020	192,280	12,890
California	3,629,030	1,476,540	1,665,350	422,040	65,090
Colorado 113,930		31,680	21,990	57,960	2,300
Connecticut	45,860	3,440	5,080	33,390	3,950
Delaware	21,500	0	2,560	18,940	0
Florida	2,513,390	847,310	1,171,030	492,860	2,200
Georgia	6,994,830	2,972,760	2,889,040	1,087,890	45,140
Idaho	2,219,550	1,265,060	825,880	122,610	6,010
Illinois	282,420	61,060	97,910	104,920	18,520
Indiana	766,650	243,420	150,360	362,240	10,630
Iowa	181,810	3,280	28,460	149,910	160
Kansas	27,500	5,530	3,000	10,250	8,720
Kentucky	1,550,470	432,260	463,290	599,730	55,200
Louisiana	4,611,930	1,756,760	2,677,480	147,610	30,080
Maine	506,010	190,440	166,820	106,270	42,480
Maryland	222,510	40,070	12,330	153,030	17,070
Massachusetts	126,770	23,340	41,200	62,230	0
Michigan	1,850,630	517,590	946,470	372,800	13,760
Minnesota	1,232,550	133,450	996,530	75,700	26,880
Mississippi	6,542,100	2,423,340	3,284,510	739,120	95,140
Missouri	1,146,430	206,690	148,650	711,310	79,790
Montana	1,510,080	1,075,350	286,000	139,600	9,140
Nebraska	46,710	0	7,800	33,930	4,970
Nevada	0	0	0	0	0
New Hampshire	335,450	82,920	125,670	119,850	7,020
New Jersey	8,720	0	1,340	5,950	1,440
New Mexico	114,000	58,000	8,710	42,390	4,900
New York	1,236,310	210,720	453,000	545,200	27,390
North Carolina	5,249,660	2,229,160	1,772,510	1,235,180	12,810
North Dakota	430	0	80	90	260
Ohio	352,880	40,670	140,010	149,600	22,600
Oklahoma	826,190	282,710	466,650	76,340	500
Oregon	7,577,270	5,439,820	1,559,250	561,870	16,320
Pennsylvania	1,628,140	351,080	419,530	686,560	170,970
Rhode Island	15,310	0	290	14,640	390
South Carolina	2,808,670	1,140,530	1,454,330	212,760	1,050
South Dakota	230,500	148,030	31,730	48,440	2,290
Tennessee	2,009,600	622,210	844,040	355,770	187,580
Texas	4,843,870	1,686,570	2,728,800	425,480	3,020
Utah	41,110	360	5,240	31,070	4,440
Vermont	104,440	59,940	44,500	0	0
Virginia	2,897,960	1,130,530	1,211,790	516,280	39,370
Washington	5,278,350	2,682,220	1,593,360	981,320	21,450
West Virginia	843,300	272,170	281,230	171,120	118,780
Wisconsin	1,708,220	357,640	947,400	342,770	60,410
Wyoming	219,840	96,940	44,910	43,980	34,010
Total	**86,712,401**	**35,409,538**	**36,727,621**	**13,279,682**	**1,295,560**

Source:
USDA-FS (U.S. Department of Agriculture - Forest Service). 2007. "Timber Products Output Mapmaker Version 1.0"

Although the mill residues shown in the map below are currently unused, they represent a source of biomass that could be utilized fairly easily compared with other sources of biomass.

Section: FEEDSTOCKS
Unused Mill Residues in the U.S. by County

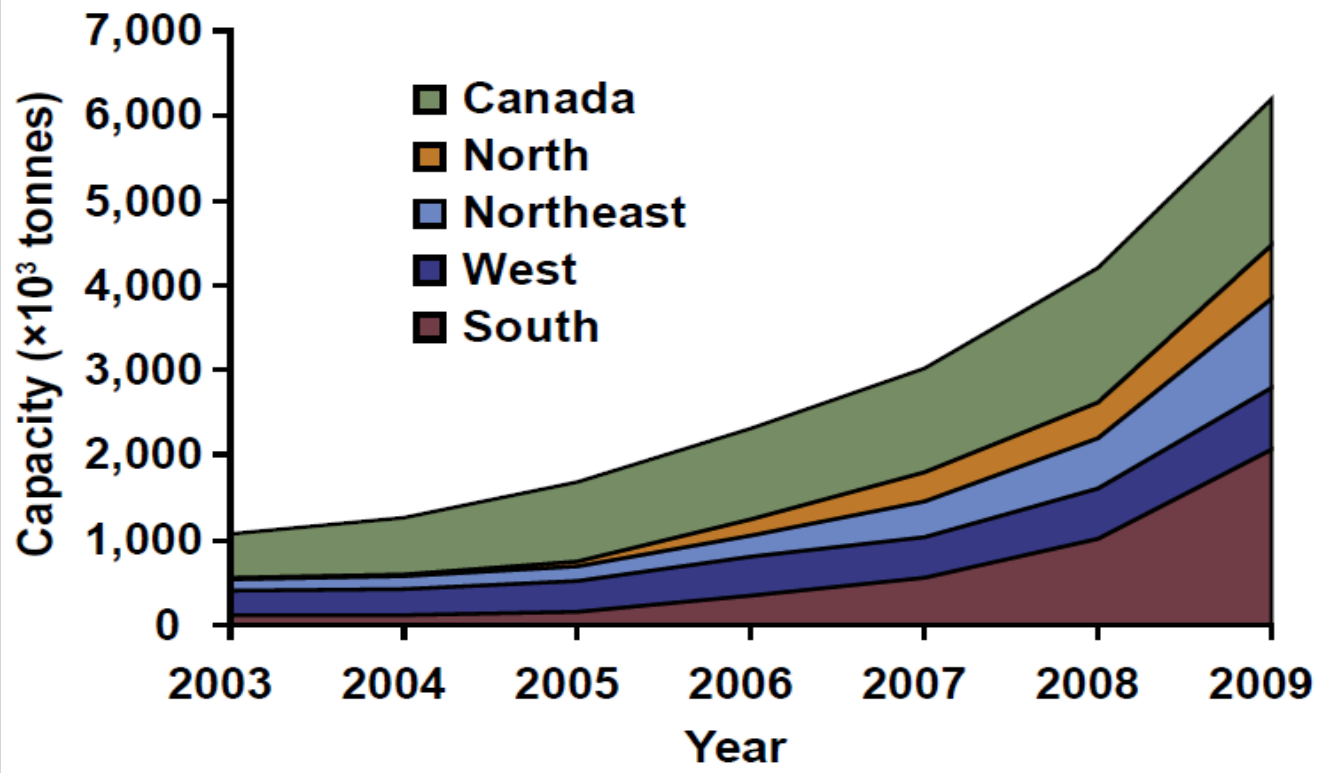


Source:
USDA-FS (U.S. Department of Agriculture - Forest Service). 2007. "Timber Products Output Mapmaker Version 1.0"

Note: Map created by Bioenergy Resource and Engineering Systems Program, Oak Ridge National Laboratory.

Wood pellet capacity increased sharply from 2005 to 2009. In 2008 U.S. production was 66% of capacity while Canadian production was about 81% of capacity that year. About 80% of U.S. pellet production is used domestically while the remaining 20% is exported, largely to Europe where there is growing demand for pellet fuel.

Section: FEEDSTOCKS
North American Pellet Capacity, 2003-2009



Source:
United States Department of Agriculture, *North America's Wood Pellet Sector* , Henry Spelter, Daniel Toth, Research Paper FPL–RP–656, August 2009, Corrected September 2009.

Shipments of cordwood appliances have been declining over the last 10 years while shipments of pellet appliances rose sharply at times during this period. Cordwood appliances are by far the largest share of wood burning appliances.

Section: FEEDSTOCKS
Pellet and Cordwood Appliance Shipments from Manufacturers, 1998-2010

	Pellet Appliances	% Change	Cordwood Appliances	% Change
1998	34,000	a	652,500	a
1999	18,360	-46%	795,767	22%
2000	30,970	69%	609,332	-23%
2001	53,473	73%	637,856	5%
2002	33,978	-36%	534,406	-16%
2003	48,669	43%	503,699	-6%
2004	67,467	39%	498,630	-1%
2005	118,746	76%	561,696	13%
2006	133,105	12%	518,439	-8%
2007	54,032	-59%	362,243	-30%
2008	141,208	161%	345,658	-5%
2009	46,133	-67%	236,743	-32%
2010	44,269	-4%	230,787	-3%

Source:
Hearth, Patio & Barbecue Association,
http://www.hpba.org/index.php?id=238

[a] Data not available

Tertiary Biomass Feedstocks

Tertiary biomass includes post consumer residues and wastes, such as fats, greases, oils, construction and demolition wood debris, other waste wood from the urban environments, as well as packaging wastes, municipal solid wastes, and landfill gases.

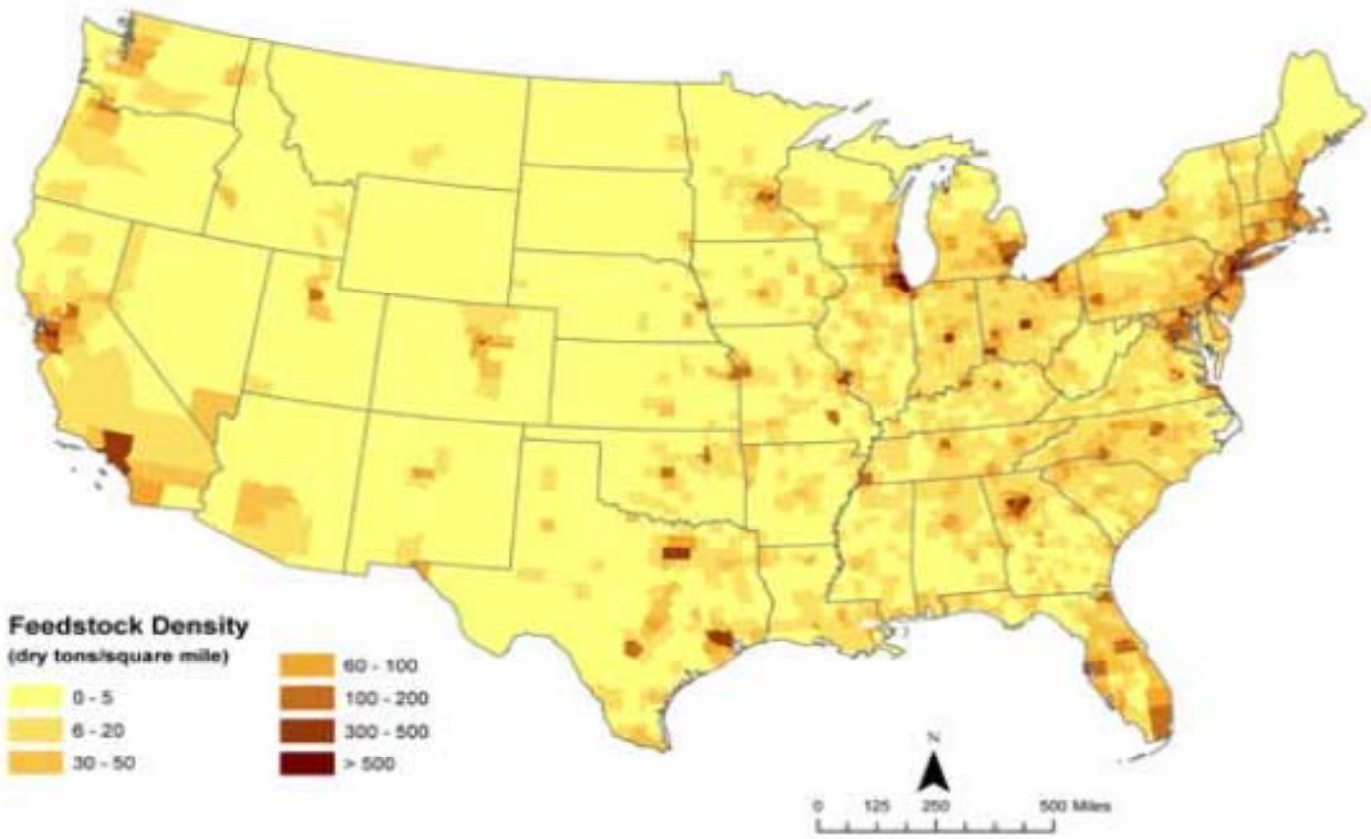
The category “other wood waste from the urban environment” could include trimmings from urban trees, which technically fits the definition of primary biomass. However, because this material is normally handled as a waste stream along with other post-consumer wastes from urban environments (and included in those statistics), it makes the most sense to consider it to be part of the tertiary biomass stream.

The proper categorization of fats and greases may be debatable since those are byproducts of the reduction of animal biomass into component parts. However, since we are considering animals to be a type of biomass processing factory, and since most fats and greases, and some oils, are not available for bioenergy use until after they become a post-consumer waste stream, it seems appropriate for them to be included in the tertiary biomass category. Vegetable oils derived from processing of plant components and used directly for bioenergy (e.g. soybean oil used in biodiesel) would be a secondary biomass resource, though amounts being used for bioenergy are most likely to be tracked together with fats, greases and waste oils.

Source: Lynn Wright, Oak Ridge, TN.

Construction and demolition produce a sizeable amount of biomass material, though, recovery and use of those materials pose economic challenges.

Section: FEEDSTOCKS
Spatial Availability of Urban Wood Waste (Municipal Solid Waste) and Construction and Demolition Wood Residues



Source:

U.S. Department of Energy. 2011. *U.S. Billion-Ton Update*: *Biomass Supply for a Bioenergy and Bioproducts Industry*. R.D. Perlack and B.J. Stokes (Leads), ORNL/TM-2011/224. Oak Ridge National Laboratory, Oak Ridge, TN. 227p. http://www1.eere.energy.gov/biomass/pdfs/billion_ton_update.pdf

Landfill gas is becoming a more prominent source of energy; all but four states are using landfill gas to some extent. There are a number of states that are utilizing the majority of landfill sites available to them.

Section: FEEDSTOCKS
Landfill Gas Projects and Candidate Landfills by State, April 2011

State	Operational Projects	Candidate Landfills
Alabama	4	18
Alaska	0	2
Arizona	3	14
Arkansas	4	7
California	77	37
Colorado	1	12
Connecticut	3	3
Delaware	3	a
Florida	16	16
Georgia	13	24
Hawaii	0	8
Idaho	2	3
Illinois	32	23
Indiana	22	12
Iowa	4	14
Kansas	6	8
Kentucky	7	18
Louisiana	6	7
Maine	2	2
Maryland	10	11
Massachusetts	20	2
Michigan	35	5
Minnesota	7	6
Mississippi	2	13
Missouri	11	15
Montana	1	3
Nebraska	2	4
Nevada	0	3
New Hampshire	7	3
New Jersey	18	3
New Mexico	2	3
New York	28	6
North Carolina	17	33
North Dakota	2	1
Ohio	19	21
Oklahoma	3	12
Oregon	7	3
Pennsylvania	38	11
Puerto Rico	0	12
Rhode Island	2	a
South Carolina	12	8
South Dakota	1	1
Tennessee	6	11
Texas	27	50
Utah	4	5
Vermont	5	a
Virginia	26	12
Virgin Islands	0	2
Washington	6	8
West Virginia	2	9
Wisconsin	26	6
Wyoming	0	2
U.S. Total	**551**	**~510**

Source:
EPA's Landfill Methane Outreach Program, April 12, 2011
http://www.epa.gov/lmop/

[a] No data available.