



2007 Survey Report on Grain Storage and Transportation

Introduction

Recent developments in the bioeconomy, especially the rapid growth in ethanol production in the Midwest Corn Belt, have opened new opportunities for agricultural producers. Through higher corn prices producers can increase farm income by expanding corn acreage and selling the corn to ethanol plants. Growing and selling corn for ethanol production, however, places demands on producers not typical of the normal production and marketing of No. 2 yellow corn.

Ethanol plants do not have long-term storage capacity for the corn used in ethanol production. They require a continuous delivery stream. Therefore, producers who want to sell directly to ethanol plants must have their own storage, either on-farm or at some other convenient location. Research indicates that Iowa ethanol plants also require a uniformly high quality of corn for their production, so producers' storage facilities must be able to maintain grain quality that meets the plants' needs. Although the number of ethanol plants continues to grow, the average distance to an ethanol plant compared to a grain elevator is considerably farther, thus increasing the cost of transporting grain to market. This report examines these issues—producers' plans for expanding corn production and marketing to ethanol plants, existing and planned storage facilities, and transporting corn to market.

Created in 1982 as a partnership of Iowa State University Extension, the Iowa Agriculture

and Home Economics Experiment Station, and the Iowa Department of Agriculture and Land Stewardship, the Iowa Farm and Rural Life Poll helps target Extension and research programs to the needs of farm families. Data on issues of importance to farmers are collected to provide input to local, state, and national leaders in their decision-making. We thank the many farm families who responded to the survey. Additional copies of this report or any previous year can be obtained from your local county Extension office, or by contacting the Extension Distribution Center at Iowa State University.

Methods

Questionnaires were mailed to a statewide panel of 1,473 Iowa farmer operators followed by reminder postcards and replacement questionnaires to maximize response rate. Usable responses were received from 1,095 operators for a 74 percent response rate. Whenever possible, data are reported by Iowa Crop Reporting District (CRD) as well as for the state. The Iowa CRDs are shown in Figure 1.

Planned Production and Marketing

Producers are responding to the needs and opportunities of the bioeconomy with plans to grow more corn and market the corn to ethanol plants. Table 1 indicates that statewide, producers had plans in 2007 to plant about 18 more acres of corn, on average, than they planted on 2006. This may require bringing

additional land into production because the planned reduction in soybeans is only three percent on average, and a small number of producers actually planned to increase production of other grains.

Within the state the greatest differences between 2006 planted and 2007 planned corn production are in the West and Central CRDs. Farmers in the three West CRDs, the North Central CRD, and Central CRD had a planned average increase of 24 acres per farm operation compared to 12 acres for the other four CRDs. A mutually reinforcing geographic relationship seems to exist between the number of corn acres and number of ethanol plants. Ethanol plants initially located in areas of the state with the greatest corn production (Figure 2), and the greatest increases in corn production were planned in areas close to ethanol plants.

Producers statewide planned to deliver nearly 1,900 more bushels of corn on average directly to ethanol plants in 2007 than they delivered in 2006 (Table 2). The biggest planned increases were in the CRD with the most bushels of corn delivered in 2006 (Central CRD with an average of 14,794 bushels delivered and 4,137 bushels planned increase), and the CRD with the fewest bushels delivered in 2006

(Southwest CRD with an average of 82 bushels delivered and 7,566 bushels planned increase). Again, planned delivery increase of corn to ethanol plants seems to be related to existing high production of corn and proximity of ethanol plants.

Grain Storage

As producers expand corn acreage with plans to sell the corn directly to ethanol plants, they also must plan for storage of the corn. Ethanol plants do not have extensive storage facilities, so producers must store their corn until the plant requests delivery. Quality of storage facilities is important in storing corn for eventual delivery to ethanol plants, but most Iowa producers are unaware that ethanol plants demand a higher quality of corn than elevators (Table 3). Across the state only one-fourth (26 percent) of respondents agreed that ethanol plants demand a higher quality of corn, one-third (33 percent) disagreed, and two-fifths (41 percent) were uncertain. More farmers were aware of the ethanol plants' need for higher quality corn in the CRDs with the most acres in corn (Northwest, North Central, West Central, Central, and Southwest), but even in these areas only about one-third of the farmers were aware of plants' higher quality demands.

Table 1. Acres of Corn, Soybeans, and Other Grains Planted in 2006 and Planned to Plant in 2007

Crop Reporting District	Corn (n=824)			Soybeans (n=748)			Other Grains (n=104)		
	Planted 2006	Planned 2007	Acres Change	Planted 2006	Planned 2007	Acres Change	Planted 2006	Planned 2007	Acres Change
Northwest.....	296	314	18	272	272	0	21	79	58
North Central.....	285	298	13	234	232	-2	17	31	14
Northeast.....	212	228	16	165	156	-9	26	28	2
West Central.....	243	264	21	210	221	11	63	32	-31
Central.....	345	374	29	276	262	-14	26	22	-4
East Central.....	173	192	19	137	124	-13	24	18	-6
Southwest.....	287	318	31	289	273	-16	36	30	-6
South Central.....	107	110	3	109	101	-8	34	28	-6
Southeast.....	161	176	15	163	154	-9	34	37	3
State Total.....	249	267	18	216	210	-6	29	33	4

Table 2. Bushels of Corn Delivered Directly to Ethanol Plants in 2006, and Planned Delivery in 2007

Crop Reporting District	Bushels of Corn Delivered in 2006 (n=838)	Bushels of Corn Planned to Deliver 2007 (n=813)	Bushels Change
Northwest.....	5,776	6,381	605
North Central.....	4,404	5,900	1,496
Northeast.....	2,923	5,347	2,424
West Central.....	5,186	5,062	-124
Central	14,794	18,931	4,137
East Central	5,621	7,000	1,379
Southwest	82	7,648	7,566
South Central	186	179	-7
Southeast	773	1,076	303
State Total.....	5,436	7,308	1,872

Table 3. Agreement that Ethanol Plants Demand a Higher Quality of Corn than Elevators (n=1,085)

Crop Reporting District	Strongly Disagree/ Disagree	Uncertain	Agree/ Strongly Agree
Northwest.....	35	32	33
North Central.....	36	28	36
Northeast.....	31	46	23
West Central.....	38	35	27
Central	29	44	27
East Central	33	15	17
Southwest	29	45	26
South Central	38	43	19
Southeast	29	49	22
State Total.....	33	41	26

Table 4 shows that farmers planting more acres of corn also tend to be more aware that ethanol plants do demand a higher quality of corn. Farmers who agreed that ethanol plants demand a higher quality of corn planted about 40 more acres in 2006 and planned to plant about 40 more acres in 2007 than producers who disagreed or were undecided.

Seventy-three percent of producers responded that they either owned or had access to on-farm grain storage facilities for the land they farmed (Table 5). Most of these producers (91 percent) stated that they had round bins with an average total storage capacity just under

Table 4. Agreement that Ethanol Plants Demand a Higher Quality of Corn than Elevators by Acres of Corn Planted in 2006 and Planned to Plant in 2007

	Acres
Corn planted 2006 (n=831)	
Disagree/Undecided.....	234
Agree.....	272
Corn planned 2007 (n=819)	
Disagree/Undecided.....	251
Agree.....	292

39,000 bushels, but one-third (33 percent) also had other buildings or structures with an average total storage capacity of nearly 12,000 bushels. For the state, overall mean storage capacity was just over 50,000 bushels per producer. Again, the greatest storage capacity was in the five CRDs with the most corn acreage—Northwest, North Central, West Central, Central, and Southwest.

Twelve percent of producers in the survey planned to increase grain storage capacity by adding grain storage facilities over the next three years. Eleven percent will add round bins with an average storage capacity just over 29,000 bushels. About one percent had plans to add other buildings or structures with an average storage capacity of about 27,000 bushels, and a similar percentage planned to adapt existing buildings or structures with an average storage capacity slightly less than 5,500 bushels (not shown in Table 5).

Only two percent of producers had an investment in off-farm grain storage facilities such as joint ownership or condo storage, and two percent had plans to invest in off-farm grain storage facilities over the next three years

(not shown in Table 5). Total average capacity of existing investment in off-farm grain storage for producers with such an investment was 22,000 bushels, and planned investment in capacity was slightly less than 19,000 bushels.

Producers who own the land they farm are generally assumed more likely to make capital improvements such as structures and facilities than farmers who rent or lease the land they farm. Data in Table 6 support that assumption. Producers who own or have access to grain storage facilities and/or have plans to add such facilities have operations that are at least twice as large in total acres planted to crops in 2006, and approximately twice as large in the number of acres owned of that total.

Transportation

Transporting corn to ethanol plants may be an additional expense that reduces profitability for some producers. The average one-way hauling distance to an ethanol plant (28 miles) was about two-and-one-half times the average one-way hauling distance to the most frequently used market delivery point other than an ethanol plant (11 miles) (Table 7); however,

Table 5. Own or Have Access to Grain Storage Facilities and Plans to Add Grain Storage Facilities Over the Next Three Years—Types, Numbers, and Bushel Capacities

Crop Reporting District	Own or Have Access		Round Bins		Other Buildings/ Structures		Overall	Plans to Add		Round Bins	
	Percent	(n)	Mean Number	Mean Total Capacity	Mean Number	Mean Total Capacity	Mean Total Capacity	Percent	(n)	Mean Number	Mean Total Capacity
	Northwest.....	76.8	(126)	4.9	44,769	1.7	12,123	56,892	12.3	(20)	1.3
North Central.....	71.3	(82)	5.8	50,384	1.4	11,495	61,879	10.6	(12)	1.3	33,818
Northeast.....	70.5	(105)	3.4	34,410	1.5	14,900	49,310	12.3	(18)	1.2	25,250
West Central.....	76.5	(75)	4.8	37,368	1.6	16,959	54,327	19.4	(19)	1.2	23,821
Central.....	77.6	(125)	5.3	50,461	1.5	12,936	63,397	14.6	(23)	1.3	40,470
East Central.....	67.5	(104)	3.5	30,591	1.5	10,648	41,239	9.2	(14)	1.1	23,884
Southwest.....	92.3	(60)	5.2	36,776	1.6	7,787	44,563	15.6	(10)	1.9	27,250
South Central.....	62.4	(53)	3.2	17,406	1.4	3,713	21,119	7.1	(6)	1.2	8,500
Southeast.....	60.6	(57)	4.2	26,854	1.9	8,373	35,227	10.6	(10)	1.8	21,500
State Total.....	72.5	(787)	4.6	38,669	1.5	11,716	50,385	12.3	(132)	1.3	29,134

Table 6. Own or Have Access to and/or Plan to Add Grain Storage Facilities by Total Acres Planted to Crops and Acres Owned Planted to Crops, 2006

	Total Acres Planted to Crops (n=953)	Acres Owned Planted to Crops (n=838)
Own or have access to grain storage:		
Yes	508	236
No	189	103
Plan to add grain storage:		
Yes	754	301
No	378	186

the delivery distance to ethanol plants may decrease in the future in any or all of the CRDs as additional plants come on-line. The South Central CRD had the longest hauling distance to an ethanol plant (57 miles), and the five CRDs with the largest corn acres are all at or below the average mileage except the West Central CRD which was just over the mean with 29 miles.

Table 8 shows the types, numbers, and total capacities of equipment that producers typically used for hauling grain to market. Nearly one-half of the producers (47 percent) used tractor-pulled wagons with an average total capacity of about 1,200 bushels. About one-fourth (24 percent) used semi-trucks with an average total capacity just under

1,400 bushels. Straight trucks and fifth wheels were used by about one-fifth (19 percent) of producers with 660 bushels average capacity. Distribution of grain hauling capacity did not seem to be closely tied to the volume of grain to be moved. Producers in the East Central CRD with relatively fewer acres of corn, soybeans, and other grains have the greatest overall hauling capacity, and producers in the Southwest CRD with relatively more acres of grain have the second lowest overall grain hauling capacity.

Summary

Iowa producers are taking advantage of opportunities emerging from the bioeconomy with plans to increase corn production and

Table 7. Average One-Way Haul Distance to the Most Frequently Used Market Delivery Point Other than an Ethanol Plant, and to an Actual or Potential Most Frequently Used Ethanol Plant

Crop Reporting District	Market Delivery Point-Mean Distance in Miles	
	Ethanol Plant (n=785)	Other Delivery Point (n=916)
Northwest.....	17	6
North Central.....	21	7
Northeast.....	33	16
West Central.....	29	14
Central	22	7
East Central	32	14
Southwest	28	19
South Central	57	15
Southeast	36	14
State Total.....	28	11

Table 8. Type, Number, and Total Bushel Capacity of Equipment Typically Used for Transporting Grain to Market

Crop Reporting District	Tractor-Pulled Wagons (n=517)		Straight Trucks, Fifth Wheels (n=203)		Semi-Trucks (n=273)	
	Number	Total Bushel Capacity	Number	Total Bushel Capacity	Number	Total Bushel Capacity
Northwest.....	3.7	1,363	1.4	608	1.4	1,189
North Central.....	3.3	1,192	1.3	661	1.2	1,386
Northeast.....	3.2	1,040	1.6	775	1.3	1,458
West Central.....	2.5	890	1.2	1,035	1.2	1,063
Central	3.0	1,213	1.2	625	1.4	1,122
East Central	3.3	1,550	1.4	797	1.7	2,306
Southwest	2.5	678	1.3	584	1.2	1,047
South Central	2.7	646	1.3	475	1.1	908
Southeast	3.7	1,681	1.3	528	2.1	1,499
State Total.....	3.2	1,193	1.3	660	1.4	1,370

sales directly to ethanol plants. The greatest planned increase in corn production and delivery to ethanol plants was in the West and Central CRDs, areas that already are strong in corn production and have a growing number of ethanol plants. Almost three-quarters of producers in the survey either owned or had access to grain storage facilities, and about 12 percent were planning to construct additional facilities over the next three years. The greatest storage capacities also were in areas with the most corn acreage. Producers with more acres planted to crops and owning more of those acres also were more likely to have had and/or planned to add more grain storage capacity.

A potential problem is that many producers, especially the smaller producers, were not aware that ethanol plants prefer a higher and more consistent quality of corn than elevators. Unlike grain elevators that often blend varying grades to achieve an average No. 2 yellow corn, ethanol plants require all of the corn to be higher grade. Iowa State University Extension and other organizations that serve farmers should work to fill this educational need.

Average one-way hauling distance to ethanol plants was about two-and-one-half times the hauling distance to the most frequently used alternative (28 vs. 11 miles). The shortest hauling distances to ethanol plants were in the CRDs with the largest number of acres in corn. But hauling capacity does not seem to be so rationally distributed. Producers in the eastern CRDs with relatively few acres in corn, soybeans, and other grains had the largest hauling capacity, and producers in some CRDs with larger crop acres had considerably less hauling capacity.

Demand for ethanol and the number of ethanol plants in operation and under construction continues to change in a volatile energy economy. Whether the ethanol plants being planned or under construction will actually be completed, whether producers will further increase corn production, and whether they will actually construct the additional grain storage facilities they have planned will depend on increasing demand for ethanol. And not to be discounted is the development of alternative ethanol producing processes, such as cellulosic ethanol.

Figure 1. Iowa Crop Reporting Districts

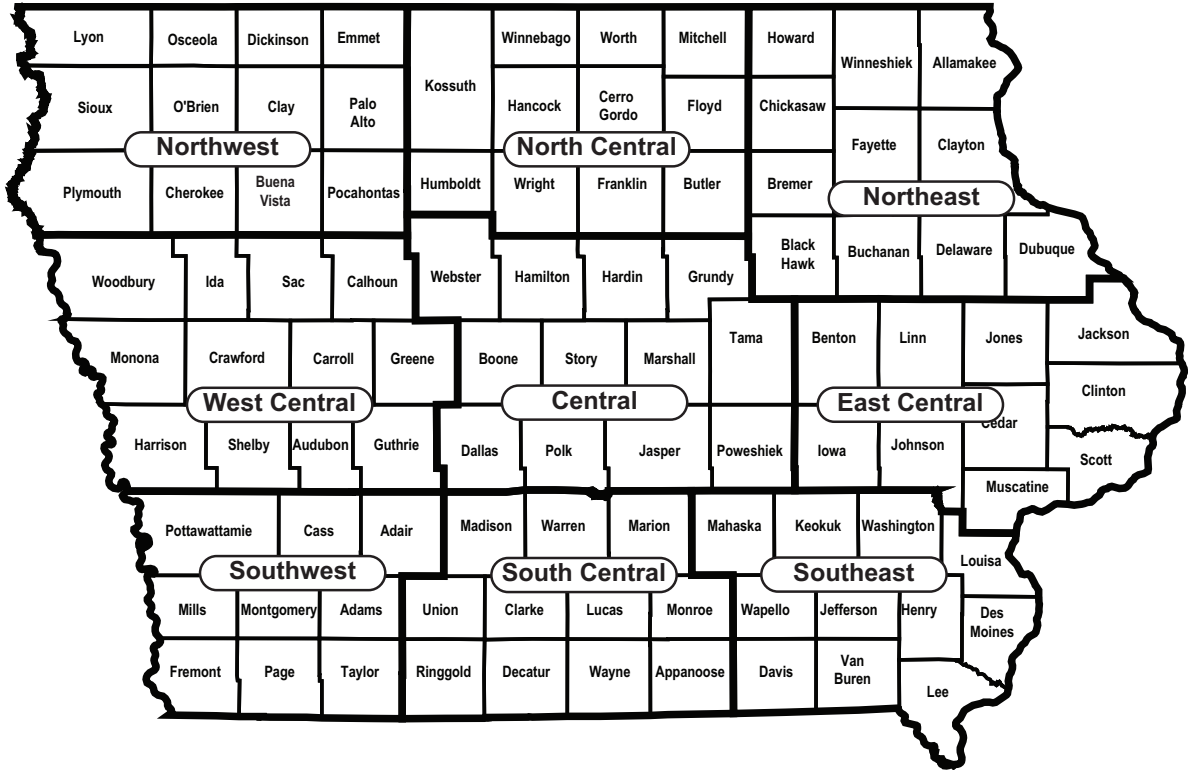
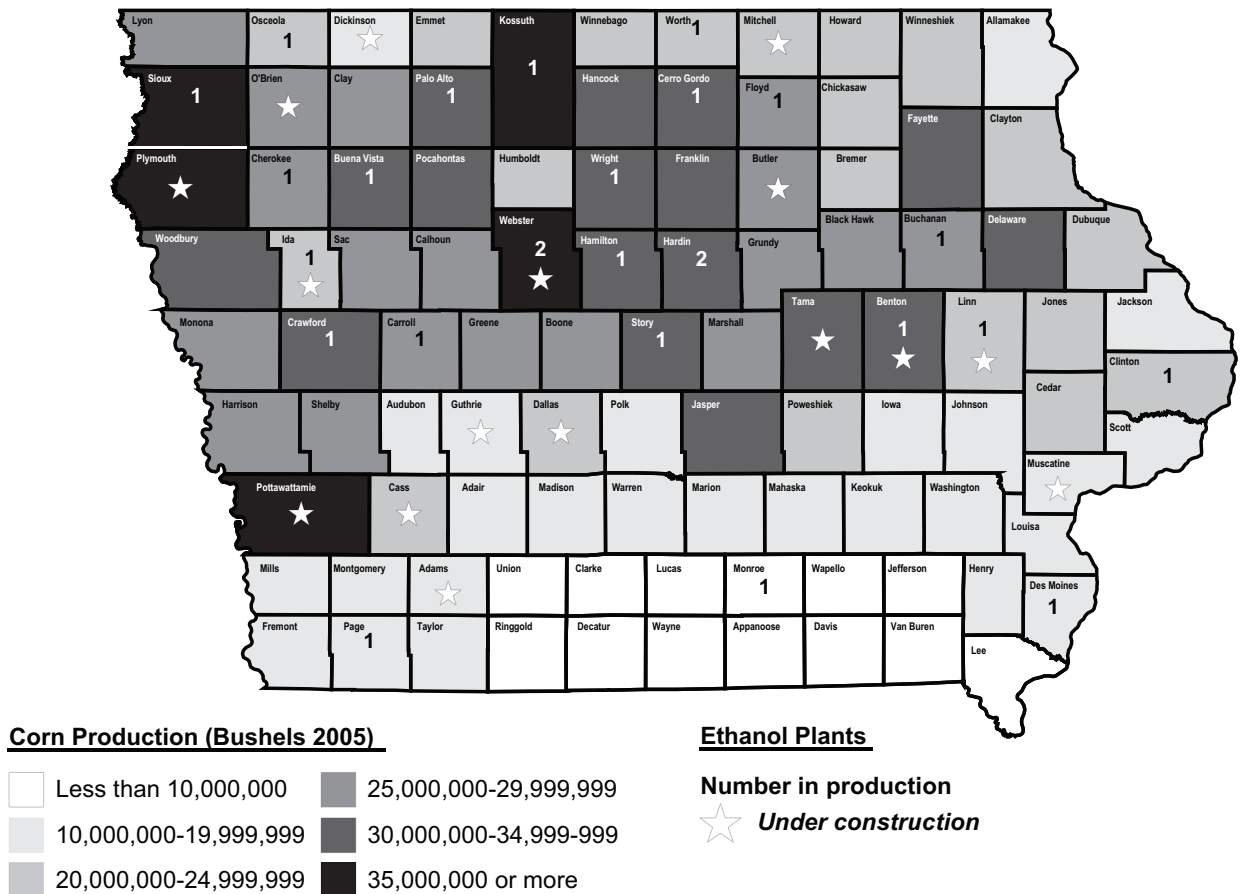


Figure 2. Corn production by county and location of ethanol plants in production and under construction



For more information from the 2007 Iowa Farm and Rural Life Poll, see the following additional reports which are available at www.extension.iastate.edu/store

PM 2043, *Iowa Farm and Rural Life Poll 2007 Summary Report*. This is an overview of the complete 2007 Poll and is available as a paper copy or online.

PM 2044, *Iowa Farm and Rural Life Poll 2007 Survey Report on Farmer Entrepreneurship* (available only online)

PM 2050, *Iowa Farm and Rural Life Poll 2007 Survey Report on Farmers' Views on the Bioeconomy* (available only online)

Prepared by Peter Korsching, professor, J. Gordon Arbuckle, Jr., extension sociologist, Paul Lasley, extension sociologist, and Trevalyn Gruber. Renea Miller and Del Marks provided valuable layout assistance to the questionnaire and this report. The Iowa Department of Land Stewardship, Division of Statistics, assisted in the data collection.

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