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# The Iowa Grain Flow Survey:

## Where and How Iowa Grain Producers and Country Elevators Shipped Corn and Soybeans During September 1, 1999, – August 31, 2000

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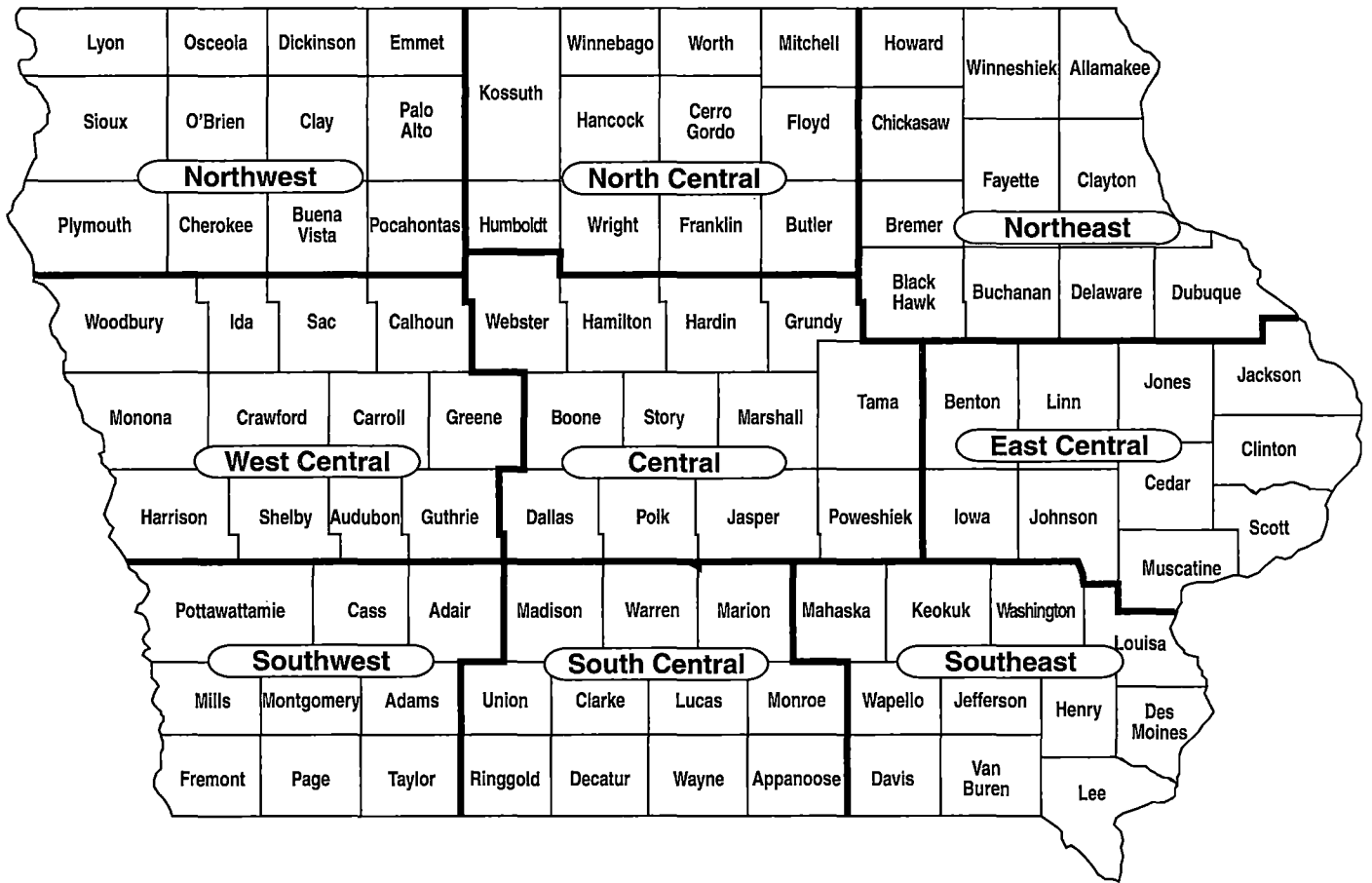
## Introduction

In September 1996, Iowa State University, the Iowa Department of Agriculture and Land Stewardship, and the Iowa Department of Transportation completed and published a grain flow survey consisting of two parts.<sup>1/</sup> One was a farm-to-market survey from a sample of Iowa grain producers. The second was a survey of all Iowa country elevators. An updated survey for the crop year September 1, 1999, - August 31, 2000, was initiated in September, 2000. The results of two updated surveys are presented in this new report. The purpose of these surveys is to estimate the amount of Iowa corn and soybeans that are shipped from each crop reporting district to each major market. Copies of the two questionnaires are presented in the appendices. A map showing the boundaries of the nine CRDs is presented in Figure 1.

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<sup>1/</sup> Baumel, C. Phillip, Jean-Philippe Gervais, Harold Hommes and Craig O'Riley, "The Iowa Grain Flow Survey: Where and How Iowa Grain Producers and Country Elevators Ship Corn and Soybeans," EDC96, Iowa State University, University Extension, Ames, Iowa, September 1996.

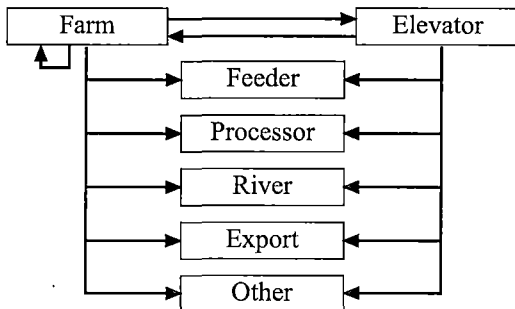
**Figure 1. Iowa Crop Reporting Districts**



## Grain distribution

Grain flows in many directions. Figure 2 illustrates many of the options grain producers and country elevators have in distributing grain.

**Figure 2. Iowa Grain Distribution System**



## Farm-to-market survey

The producer grain flow data were collected by questionnaire from a random sample of 3,125 grain producers drawn from a sub-set of 62,507 farm operators who had reported growing corn and/or soybeans in at least one of the crop years between 1997-1999. This sub-set was a representative random sample of corn and soybean producers. In comparison, a typical survey in a research project will have a sample size of about 400 persons. Thus, the 3,125 producers in the sample in this grain flow survey is quite large.

Iowa Agricultural Statistics played a major role in these two surveys. First, they assisted in developing

the questionnaire. They then drew the farm sample, sent the questionnaires to the sample producers and all country elevators, and collected the completed questionnaires and coded the raw-data onto a CD-ROM.<sup>2/</sup>

The 3,125 producer questionnaires were mailed by Iowa Agriculture Statistics on September 22, 2000. A second mailing was sent out on February 13, 2001. The two mailings yielded 695 useable responses, a return of 22.2 percent. Mail surveys with a single mailing generally produce a 15 percent response rate. A second mailing normally increases the response rate to 20–25 percent. Thus, the 22.2 percent response rate for this survey with two mailings was about average. A more complicated questionnaire, like the ones used in this study, will generally reduce the response rate.

The number of farm operators sampled and useable questionnaires returned by crop reporting district are presented in table 1. **State totals in the tables in this study have a margin of error of approximately  $\pm 5.0$  percent at the 95 percent confidence level. Crop reporting district (CRD) totals have larger margins of error varying inversely with the number of responses in each CRD.**

<sup>2/</sup> The sponsors and authors greatly appreciate the support and assistance of Susan Cowles, Howard Holden and Jim Sands of the Iowa Agricultural Statistics.

**Table 1. Number of farm operators, number sampled and number of usable questionnaires returned by crop reporting district in Iowa, 1999 - 2000.**

<u>CRD</u>	<u>Number of farms with corn/soybean acres</u>	<u>Number of farm operators sampled</u>	<u>Number of useable questionnaires returned</u>	<u>Percent response</u>
Northwest	8,545	450	113	25.1
North Central	7,036	341	88	25.8
Northeast	9,174	434	89	20.5
West Central	7,576	381	76	19.9
Central	7,780	378	80	21.2
East Central	7,413	366	82	22.4
Southwest	4,654	228	51	22.4
South Central	4,679	247	49	19.8
Southeast	5,650	300	67	22.3
<b>Total</b>	<b>62,507</b>	<b>3,125</b>	<b>695</b>	<b>22.2</b>

Source: Iowa Agricultural Statistics, Des Moines, Iowa

Table 2 compares 1994 and 1999, Iowa corn and soybean production. Corn production declined 157 million bushels, or 8.2 percent, from 1994 to 1999. This lower corn production is a major reason for smaller corn marketings in September 1, 1999, to August 31, 2000, and for some changes in corn flows in many of the following corn flow tables.

Soybean production increased 35.5 million bushels, or 8.0 percent, from 1994 to 1999. Thus, soybean marketings should be higher during September 1, 1999, to August 31, 2000, than for the 1994 crop.

Table 3 shows the corn sales by crop reporting district (CRD). About 77 percent of the corn was sold off farms. The Central CRD had the largest percent of corn sales while the West Central had the lowest. A substantial amount of corn is manufactured into feed and/or hauled back to farms for livestock consumption. Almost 15 percent was fed on the farms that produced the corn. Another 7.9 percent remained in on-farm inventories. A small amount of this 7.9 percent remaining in farm inventories includes physical losses during the handling of this corn.

**Table 2. Comparison of 1994 and 1999 corn and soybean production by crop reporting district, in millions of bushels, Iowa.**

CRD	Millions of bushels			
	Corn		Soybeans	
	1994	1999	1994	1999
Northwest	284.3	294.9	78.3	82.1
North Central	267.3	250.2	60.9	65.4
Northeast	221.2	218.1	29.4	45.0
West Central	278.5	255.3	71.7	69.8
Central	287.4	265.8	73.8	75.9
East Central	216.2	190.8	36.7	48.2
Southwest	145.2	125.0	39.3	39.3
South Central	75.4	56.6	19.0	20.5
Southeast	139.7	101.5	33.8	32.2
<b>Total</b>	<b>1,915.2</b>	<b>1,758.2</b>	<b>442.9</b>	<b>478.0</b>
<b>Percent change</b>		<b>(- 8.2)</b>		<b>(7.9)</b>

**Table 3. Estimated quantities of corn marketed, fed and stored, by crop reporting district, in millions of bushels, Iowa, September 1, 1999, - August 31, 2000.**

CRD	Marketed		Fed on farms		Remained on farm	
	Bushels	Percent	Bushels	Percent	Bushels	Percent
Northwest	231.1	78.4	42.7	14.5	21.1	7.2
North Central	207.0	82.7	29.0	11.6	14.2	5.7
Northeast	163.6	75.0	36.7	16.8	17.8	8.2
West Central	166.2	65.1	50.4	19.7	38.7	15.2
Central	232.0	87.3	21.3	8.0	12.5	4.7
East Central	136.6	71.6	37.3	19.5	16.9	8.9
Southwest	108.0	86.4	14.5	11.6	2.5	2.0
South Central	39.3	69.4	8.1	14.3	9.2	16.3
Southeast	73.8	72.7	22.0	21.8	5.7	5.6
<b>Total</b>	<b>1,357.6</b>	<b>77.2</b>	<b>262.0</b>	<b>14.9</b>	<b>138.6</b>	<b>7.9</b>

## Corn flows from farms

Table 4 presents the quantities of corn delivered by grain producers by type of vehicle. More corn—647 million bushels—was hauled from farms in semis than in any other vehicle during the September 1, 1999, - August 31, 2000, crop year. This was up 12 percent from the 578 million bushels hauled by semis in the September 1, 1994, - August 31, 1995, crop year. Farmers in the North Central, Central, and East Central CRDs delivered 286 million bushels or approximately 50 percent of their marketed bushels in semis. This is particularly significant since the 1999 corn crop was 8 percent below the 1994 crop.

Wagons delivered 355 million bushels, down from almost 500 million bushels in the 1994-1995 crop year. About 60 percent of the wagon-delivered corn originated in the Northwest, North Central and Central CRDs. This large amount of wagon-delivered corn is probably the result of the numerous train-loading elevators and the absence of corn processors in these three CRDs. The large number of elevators allows grain producers to utilize train-loading facilities within the economic hauling distances of tractor-wagons. Tandem-axle trucks delivered less than half as much corn as semis but over three times as much as single axle trucks.

Table 5 presents the percent of corn delivered by vehicle type. Statewide, semis hauled almost 48

**Table 4. Estimated quantities of corn delivered from farms, in millions of bushels, by type of vehicle and crop reporting district, Iowa, September 1, 1999, - August 31, 2000.**

<u>CRD</u>	<u>Millions of bushels</u>				<u>Total</u>
	<u>Wagon</u>	<u>Single-axle</u>	<u>Tandem-axle</u>	<u>Semi</u>	
Northwest	97.2	24.3	40.7	68.9	231.1
North Central	59.5	11.0	41.6	94.9	207.0
Northeast	31.4	5.3	54.1	72.8	163.6
West Central	42.9	14.1	34.7	74.5	166.2
Central	56.3	19.5	59.7	96.5	232.0
East Central	21.3	1.4	18.9	95.0	136.6
Southwest	12.5	6.8	6.1	82.7	108.0
South Central	7.2	3.1	10.3	18.7	39.3
Southeast	<u>26.9</u>	<u>0.9</u>	<u>2.8</u>	<u>43.2</u>	<u>73.8</u>
<b>Total</b>	<b>355.2</b>	<b>86.4</b>	<b>268.9</b>	<b>647.1</b>	<b>1,357.6</b>

**Table 5. Estimated percent of corn delivered from farms, by type of vehicle and crop reporting district, Iowa, September 1, 1999, - August 31, 2000.**

<u>CRD</u>	<u>Percent</u>			
	<u>Wagon</u>	<u>Single-axle</u>	<u>Tandem-axle</u>	<u>Semi</u>
Northwest	42.1	10.5	17.6	29.8
North Central	28.8	5.3	20.1	45.8
Northeast	19.2	3.2	33.1	44.5
West Central	25.8	8.5	20.9	44.8
Central	24.3	8.4	25.7	41.6
East Central	15.6	1.0	13.8	69.6
Southwest	11.6	6.3	5.6	76.5
South Central	18.4	7.8	26.2	47.6
Southeast	<u>36.4</u>	<u>1.2</u>	<u>3.8</u>	<u>58.6</u>
<b>Percent</b>	<b>26.2</b>	<b>6.4</b>	<b>19.8</b>	<b>47.6</b>

percent of the corn delivered from farms, up from 37 percent during September 1, 1994, – August 31, 1995.<sup>3/</sup> Over 75 percent of the corn hauled from farms in the Southwest CRD and nearly 70 percent from the East Central CRD were delivered by semis. These CRDs have large quantities of corn delivered by semis because the East Central CRD is located close to corn processors and barge terminals on the Mississippi River and the Southwest is located close to the Kansas City, St. Joseph, and Omaha-Council Bluffs markets.

The other CRD with a higher than average percent of corn delivered by semis was the Southeast with 59 percent. This CRD is located close to processor and barge markets. Five other CRDs had 41-48 percent of their corn delivered from farms by semis. The Northwest CRD had less than 30 percent of its corn delivered by semis. Wagons delivered slightly over one-fourth of the corn, down from one-third in 1994-95. Single-axle trucks delivered only 6.4 percent of corn shipments from farms.

Table 6 shows the bushels of corn delivered to alternative destinations by CRD. Over 903 million bushel, or 66.5 percent of all corn sales, were delivered from farms to country elevators. Country elevator receipts were down 183 million bushels or 17 percent from the 1994-95 receipts. This was largely the result of 157 million bushels of lower

production in 1999 compared to 1994. Of the 903 million bushels that were delivered to country elevators, 700 million, or 78 percent, of the bushels originated in CRDs located in the Northwest quadrant of Iowa. These four CRDs have an extensive network of train-loading elevators with rapid receiving capacities and attractive rail rates. These facilities and rates are generally not available in eastern and southern CRDs. Moreover, these CRDs are located longer distances from corn processors and Mississippi River barge terminals than the other three quadrants of Iowa and rely more on railroads than the other CRDs.

More than 143 million bushels of corn were delivered directly from farms to Iowa corn processors. Almost half of these 143 million bushels originated in the three eastern CRDs where large corn processing plants are located. About 68 million bushels were delivered to in-state and out-of-state feeders. Most of these deliveries to feeders originated in the West Central, Northwest, and East Central CRDs.

More than 128 million bushels were delivered directly to the Mississippi River, down from 164 million bushels in 1994-95. This decline in Mississippi River receipts was the result of the smaller corn crop, lower export demand for corn, and an increase in railroad shipments direct to export ports (see tables 21 and 22).

<sup>3/</sup> Baumel et al. op cit.

**Table 6. Estimated quantities of corn delivered from farms, in millions of bushels, by destination and crop reporting district, Iowa, September 1, 1999, - August 31, 2000.**

CRD	Millions of bushels									
	Country elevators	In-state processors	Out-of-state processors	Illinois River	Mississippi River	Missouri River	In-state feeders	Out-of-state feeders	Other and unknown	Total
Northwest	201.6	7.4	0.0	0.0	0.0	0.0	18.7	0.0	3.4	231.1
North Central	190.3	2.5	1.8	0.0	3.3	0.0	6.7	0.0	2.4	207.0
Northeast	65.0	30.2	1.2	0.0	64.5	0.0	1.6	0.0	1.1	163.6
West Central	101.6	12.8	21.5	0.0	1.1	6.7	20.2	1.8	0.5	166.2
Central	208.2	20.6	0.2	0.0	0.0	0.0	1.9	0.0	1.1	232.0
East Central	31.9	28.2	1.2	2.0	55.7	0.0	13.9	0.0	3.7	136.6
Southwest	39.0	9.7	4.8	0.0	0.0	50.0	0.6	2.8	1.1	108.0
South Central	21.5	9.1	0.0	0.0	0.0	4.9	0.0	0.1	3.6	39.3
Southeast	44.0	23.2	1.0	0.0	3.5	0.0	0.0	0.0	2.0	73.8
<b>Total</b>	<b>903.1</b>	<b>143.6</b>	<b>31.7</b>	<b>2.0</b>	<b>128.2</b>	<b>61.6</b>	<b>63.7</b>	<b>4.7</b>	<b>19.0</b>	<b>1,357.6</b>



Table 7 shows the percentage of corn delivered from farms to each destination. Over 66 percent of the farm-to-market corn sales was delivered to country elevators, down from 70 percent in 1995. The largest percent of country elevator deliveries was in the North Central, Central, and Northwest CRDs. Deliveries to country elevators were the lowest in the East Central, Southwest, and Northeast CRDs.

Statewide, almost 13 percent of the corn shipments from Iowa farms was delivered to corn processors, up from 10 percent in 1994-95. Only the North Central and Northwest CRDs delivered small amounts — less than 4 percent — to corn processors. The percent of corn delivered directly to the Mississippi River declined from 10.6 percent in 1994-95 to 9.4 percent in 1999-2000. This reduction is likely related to the smaller 1999 corn crop. Only the Northeast and East Central delivered significant amounts of corn to the Mississippi River. About 4.5 percent of total corn sales was delivered to Missouri River destinations. Most of these Missouri River deliveries were from the Southwest CRD. Based on industry estimates, only about 5 percent of the corn delivered to Missouri River destinations is shipped down the Missouri River by barge. Most of the corn received by Missouri River destinations is shipped to southwest and west coast markets in unit-grain-trains.

### *Soybean flows from farms*

Table 8 shows the soybean sales by CRD. Almost 94 percent of the soybeans produced in 1999-2000 was marketed during the same crop year. About 5.5 percent remained on farms. The amount that remained on farms includes soybeans used for seed, carry over and physical losses in handling. A small amount — 0.8 percent — was processed and/or fed on the farms where it was grown.

Table 9 presents the estimated quantities of soybeans delivered from farms by vehicle type. Semis hauled the largest quantities —201 million bushels—up sharply from the 137 million bushels hauled by semis in 1994-95. Even with an 8 percent larger soybean crop, wagons hauled only 138 million bushels, down from 165 million bushels in 1994-95. The quantities hauled in single- and tandem-axle trucks were also down from the 1994-95 levels of 52.1 and 85.3 million bushels respectively.

Table 10 shows the percentages of soybean delivered from farms by each type of vehicle. Semis delivered almost 45 percent of the soybeans, up sharply from the 31 percent of the 1994-95 soybeans hauled by semis. Wagons delivered 31 percent, while single and tandem axle trucks combined delivered slightly less than one fourth of the soybeans. The shares hauled by all vehicles, other than semis, declined from the 1994-95 levels.

**Table 7. Estimated percent of marketed corn delivered from farms, by destination and crop reporting district, Iowa, September 1, 1999, - August 31, 2000.**

<b>CRD</b>	<b>Percent</b>								
	<b>Country elevators</b>	<b>In-state processors</b>	<b>Out-of-state processors</b>	<b>Illinois River</b>	<b>Mississippi River</b>	<b>Missouri River</b>	<b>In-state feeders</b>	<b>Out-of-state feeders</b>	<b>Other and unknown</b>
Northwest	87.2	3.2	0.0	0.0	0.0	0.0	8.1	0.0	1.5
North Central	91.9	1.2	0.9	0.0	1.6	0.0	3.2	0.0	1.1
Northeast	39.7	18.4	0.8	0.0	39.4	0.0	1.0	0.0	0.7
West Central	61.1	7.7	12.9	0.0	0.7	4.1	12.2	1.1	0.3
Central	89.7	8.9	0.1	0.0	0.0	0.0	0.8	0.0	0.5
East Central	23.3	20.7	0.9	1.5	40.8	0.0	10.2	0.0	2.7
Southwest	36.2	9.0	4.4	0.0	0.0	46.3	0.5	2.6	1.0
South Central	54.7	23.2	0.0	0.0	0.0	12.5	0.0	0.1	9.2
Southeast	59.7	31.4	1.4	0.0	4.7	0.0	0.0	0.0	2.8
<b>Percent</b>	<b>66.5</b>	<b>10.6</b>	<b>2.3</b>	<b>0.1</b>	<b>9.4</b>	<b>4.5</b>	<b>4.7</b>	<b>0.3</b>	<b>1.4</b>

**Table 8. Estimated quantities of soybeans marketed, processed and stored on farms, in millions of bushels, by crop reporting district, Iowa, September 1, 1999, - August 31, 2000.**

<b>CRD</b>	<b>Marketed</b>		<b>Processed on farms</b>		<b>Remained on farm</b>	
	<b>Bushels</b>	<b>Percent</b>	<b>Bushels</b>	<b>Percent</b>	<b>Bushels</b>	<b>Percent</b>
Northwest	76.8	93.5	0.0	0.0	5.3	6.5
North Central	60.8	93.1	3.6	5.5	1.0	1.5
Northeast	44.1	97.9	0.2	0.5	0.7	1.5
West Central	65.0	93.1	0.0	0.0	4.8	6.9
Central	74.4	98.0	0.0	0.0	1.5	2.0
East Central	41.9	87.0	0.0	0.0	6.3	13.0
Southwest	38.5	98.1	0.0	0.0	0.8	1.9
South Central	16.4	79.9	0.2	0.9	3.9	19.2
Southeast	<u>30.1</u>	<u>93.4</u>	<u>0.0</u>	<u>0.0</u>	<u>2.1</u>	<u>6.4</u>
<b>Total</b>	<b>448.0</b>	<b>93.7</b>	<b>4.0</b>	<b>0.8</b>	<b>26.4</b>	<b>5.5</b>

**Table 9. Estimated quantities of soybeans delivered from farms, in millions of bushels, by type of vehicle and crop reporting district, Iowa, September 1, 1999, - August 31, 2000.**

<b>CRD</b>	<b>Millions of bushels</b>				
	<b>Wagon</b>	<b>Single-axle</b>	<b>Tandem-axle</b>	<b>Semi</b>	<b>Total</b>
Northwest	37.3	8.9	11.6	19.0	76.8
North Central	19.9	5.0	12.7	23.2	60.8
Northeast	14.7	3.8	6.8	18.8	44.1
West Central	17.6	6.0	12.2	29.2	65.0
Central	18.8	5.9	20.4	29.3	74.4
East Central	8.0	1.4	2.0	30.5	41.9
Southwest	6.7	4.4	0.8	26.6	38.5
South Central	3.7	1.4	4.6	6.7	16.4
Southeast	<u>11.2</u>	<u>0.7</u>	<u>0.6</u>	<u>17.6</u>	<u>30.1</u>
<b>Total</b>	<b>137.9</b>	<b>37.5</b>	<b>71.7</b>	<b>200.9</b>	<b>448.0</b>

**Table 10. Estimated percent of soybeans delivered from farms, by type of vehicle and crop reporting district, Iowa, September 1, 1999, - August 31, 2000.**

<b>CRD</b>	<b>Percent</b>			
	<b>Wagon</b>	<b>Single-axle</b>	<b>Tandem-axle</b>	<b>Semi</b>
Northwest	48.6	11.6	15.1	24.7
North Central	32.7	8.2	20.9	38.2
Northeast	33.3	8.6	15.5	42.6
West Central	27.1	9.2	18.8	44.9
Central	25.3	7.9	27.4	39.4
East Central	19.0	3.3	4.8	72.8
Southwest	17.4	11.4	2.1	69.1
South Central	22.6	8.5	28.0	40.9
Southeast	<u>37.2</u>	<u>2.3</u>	<u>2.0</u>	<u>58.5</u>
<b>Total</b>	<b>30.7</b>	<b>8.4</b>	<b>16.0</b>	<b>44.9</b>

Table 11 shows the bushels of soybeans delivered from farms by destination. Country elevators received 332 million bushels, about the same number of soybeans they received in 1994-95. Over 35 million bushels were delivered directly from farms to soybean crushers. This was up slightly from 34 million bushels delivered in 1994-95. About 2.5 million bushels of soybeans delivered to processors were for human consumption.

Almost 44 million bushels of soybeans were delivered from farms to the Mississippi River, up from 38 million bushels in 1994-95. This increase in deliveries direct to the Mississippi River may reflect the increased use of semis to deliver soybeans from farms as well as the increased export demand for U.S. soybeans. Missouri River destinations received 3.2 million bushels of soybeans. Based on industry estimates, only about five percent of the soybeans delivered to Missouri River destinations is shipped by barge from the Missouri River. Most is shipped to out-of-state processors and to West Coast export ports in unit trains.

Table 12 shows the percent of Iowa soybeans delivered from farms to alternative destinations.

Country elevators received 74 percent of the soybeans delivered from farms. This is about the same percent received by country elevators in 1994-95. Soybean crushers received 8.0 percent, also about the same percentage as in 1994-95. Of the 8.0 percent delivered to crushers, 7.4 percent was delivered to processors for non-human consumption and 0.6 percent went to processors whose output was for human consumption.

Mississippi River barge terminals received 9.7 percent of the soybeans delivered from farms, up from 8.6 percent in 1994-95. Most of the soybeans delivered to Mississippi River barge terminals came from the Northeast, East Central, and Southeast CRDs. This increase in deliveries to Mississippi River barge terminals was likely the result of the increase in the number of producer-owned semis and increased export demand. Deliveries of soybeans to Missouri River destinations fell from 4.1 percent in 1994-95 to 0.7 percent in 1999-2000. This reduction in soybean deliveries to the Missouri River is probably the result of the opening of a large new soybean processing plant located south of Council Bluffs, Iowa.

**Table 11. Estimated quantities of soybeans delivered from farms, in millions of bushels, by destination and crop reporting district, Iowa, September 1, 1999, - August 31, 2000.**

CRD	Millions of bushels								
	Country elevators	In-state crushers		Out-of-state crushers		Mississippi River	Missouri River	Other and unknown	Total
		For human consumption	For non-human consumption	For human consumption	For non-human consumption				
Northwest	67.4	0.0	4.8	0.0	0.0	0.0	0.0	4.6	76.8
North Central	54.8	0.3	1.8	0.0	0.0	0.7	0.0	3.2	60.8
Northeast	24.8	0.1	0.7	0.2	0.0	11.7	0.0	6.6	44.1
West Central	53.6	0.0	3.1	0.0	1.4	0.7	0.4	5.8	65.0
Central	64.8	0.2	3.9	0.1	0.0	0.0	0.0	5.4	74.4
East Central	13.3	0.6	3.3	0.0	0.0	23.4	0.0	1.3	41.9
Southwest	24.0	0.0	12.2	0.0	0.2	0.0	1.2	0.9	38.5
South Central	10.6	0.5	1.2	0.5	0.0	0.1	1.6	1.9	16.4
Southeast	<u>18.2</u>	<u>0.0</u>	<u>0.4</u>	<u>0.0</u>	<u>0.0</u>	<u>7.2</u>	<u>0.0</u>	<u>4.2</u>	<u>30.1</u>
<b>Total</b>	<b>331.5</b>	<b>1.7</b>	<b>31.4</b>	<b>0.8</b>	<b>1.6</b>	<b>43.8</b>	<b>3.2</b>	<b>34.0</b>	<b>448.0</b>

**Table 12. Estimated percent of soybeans delivered from farms, by destination and crop reporting district, Iowa, September 1, 1999, - August 31, 2000.**

<b>CRD</b>	<b>Country elevators</b>	<b>Percent</b>						
		<b>In-state crushers</b>		<b>Out-of-state crushers</b>		<b>Mississippi River</b>	<b>Missouri River</b>	<b>Other and unknown</b>
		<b>For human consumption</b>	<b>For non-human consumption</b>	<b>For human consumption</b>	<b>For non-human consumption</b>			
Northwest	87.8	0.0	6.3	0.0	0.0	0.0	0.0	5.0
North Central	90.1	0.5	3.0	0.0	0.0	1.2	0.0	5.2
Northeast	56.2	0.2	1.6	0.5	0.0	26.5	0.0	15.0
West Central	82.5	0.0	4.8	0.0	2.1	1.1	0.6	8.9
Central	87.1	0.3	5.2	0.1	0.0	0.0	0.0	7.3
East Central	31.7	1.4	7.9	0.0	0.0	55.9	0.0	3.1
Southwest	62.3	0.0	31.7	0.0	0.5	0.0	3.1	2.4
South Central	64.6	3.1	7.3	3.1	0.0	0.6	9.7	11.6
Southeast	60.5	0.0	1.3	0.0	0.0	23.9	0.0	14.3
<b>Percent</b>	<b>74.0</b>	<b>0.4</b>	<b>7.0</b>	<b>0.2</b>	<b>0.4</b>	<b>9.7</b>	<b>0.7</b>	<b>7.6</b>

**Grain hauling vehicles**

Table 13 shows the typical legal load capacities of the four most commonly used types of grain hauling vehicles. The range of wagon capacities varies from about 300-bushels in older wagons up to 600-bushels in newer wagons. A semi is likely to haul 300 percent more corn or soybeans than a single axle truck and over 60 percent more than tandem axle trucks. Assuming a fixed amount of grain to be hauled, a semi reduces the waiting time to be unloaded at elevators and processors. In addition, the larger bushel capacity of semis helps keep the combines running at harvest and the lower cost-per-bushel-mile enables producers to economically reach more distant markets.

**Table 13. Typical capacities of four types of grain hauling vehicles, in bushels.**

<b>Type of vehicle</b>	<b>Typical capacities in bushels</b>	
	<b>Corn</b>	<b>Soybeans</b>
Wagons	250-700	250-700
Single axle truck	300	279
Tandem axle truck	550	512
Semi	900	837

Table 14 shows the average and maximum distances grain – corn and soybeans — was hauled by each of these four types of vehicles. As expected, grain hauled by wagons was transported the shortest distance. Statewide, the average distance grain was hauled by wagon was 4.7 miles. This suggests that wagon-transported grain is typically hauled to the closest market – usually the local country elevator. On average, single-axle trucks delivered grain was hauled 7.7 miles and the maximum distance was about 13 miles. This also suggests that most of this grain was hauled to the closest local market. Grain delivered in tandem-axle trucks averaged about 10.7 miles with maximum distances up to more than 20 miles. Semis provide the greatest marketing flexibility with an average hauling distance of 25 miles and maximum distance of almost 100 miles reported in the Northeast CRD. The Northeast CRD had the largest average and maximum miles hauled by semis. These longer distances are to barge terminals on the Mississippi River.

Ownership of semis gives grain producers access to a wide range of markets. This access to a wide range of markets plus the ever increasing harvesting capacity of combines and the low cost per bushel mile of semis, account for the growing number of semis owned by Iowa grain producers.

**Table 14. Estimated average and maximum miles grain (corn and soybeans) was hauled from farms, by type of vehicle and crop reporting district, Iowa, September 1, 1999, - August 31, 2000.**

<b>CRD</b>	<b>Miles</b>							
	<b>Wagon</b>		<b>Single-axle</b>		<b>Tandem-axle</b>		<b>Semi</b>	
	<b>Average</b>	<b>Maximum</b>	<b>Average</b>	<b>Maximum</b>	<b>Average</b>	<b>Maximum</b>	<b>Average</b>	<b>Maximum</b>
Northwest	4.9	7.6	8.5	14.5	9.0	14.9	13.4	38.3
North Central	4.8	7.8	7.8	14.7	8.2	17.8	19.1	36.9
Northeast	4.8	6.3	6.5	11.9	12.4	14.6	60.2	98.3
West Central	4.9	6.2	9.2	13.6	9.9	21.4	23.4	54.0
Central	4.9	6.8	8.0	10.7	11.7	21.5	28.4	37.8
East Central	3.6	5.4	4.3	6.3	14.2	19.9	18.3	29.2
Southwest	4.0	6.5	7.5	13.4	11.8	18.0	25.6	72.9
South Central	4.9	8.8	7.4	11.9	11.0	21.1	34.5	67.3
Southeast	<u>5.4</u>	<u>8.1</u>	<u>7.1</u>	<u>17.9</u>	<u>11.4</u>	<u>17.0</u>	<u>44.0</u>	<u>55.1</u>
<b>Weighted average</b>	<b>4.7</b>	<b>7.0</b>	<b>7.7</b>	<b>12.9</b>	<b>10.7</b>	<b>18.7</b>	<b>25.0</b>	<b>47.4</b>

Table 15 shows the average distances that grain was hauled from farms by type of road. The average distances were 3.2 miles on gravel roads, 5.0 miles on paved county roads, and 15.7 miles on state highways. The 3.2 miles traveled on gravel roads suggests that grain producers try to get off of gravel roads and on to paved roads as quickly as is economically feasible. The 5.0 miles on county roads indicates that these roads are used to haul grain to local markets such as local country elevators and feeders. The 15.7 miles on state highways suggests that grain producers use the primary highway system to reach more distant markets including processors, barge terminals and more distant grain-train loading facilities. As grain producers shift from wagons and small trucks to semis, the data in tables 13 and 14 suggest that there will be fewer trips but heavier gross vehicle weights on all rural roads.

Table 16 shows the estimated number of vehicles owned by farms in the year 2000 and the number expected to be owned in 2005. The estimated number of vehicles owned by grain producers in 2000 totaled 279,100, down about 8,000 vehicles from 287,000 owned in 1995. All of the decline was in wagons and single-axle trucks. The number of tandem-axle and semi trucks increased from 1994-95. However, the number of tandem-axle trucks are estimated to decline by about 12 percent by 2005.

The grain producers responding to the 1999-2000 grain flow survey indicated that they intend to continue to reduce the number of wagons and single- and tandem-axle trucks. By 2005, Iowa producers expect to have almost 60,000 fewer wagons, 6,000 fewer single-axle trucks and 1,800 fewer tandem-axle trucks. They also intend to continue to increase the number of semis from 12,300 to 16,100, an

**Table 15. Estimated average distance grain was hauled from farms by road types and crop reporting district, Iowa, September 1, 1999, - August 31, 2000.**

<b>CRD</b>	<b>Miles</b>		
	<b>Gravel roads</b>	<b>Paved county roads</b>	<b>State highways</b>
Northwest	3.5	5.3	8.3
North Central	3.1	4.8	7.2
Northeast	3.3	4.6	8.2
West Central	3.1	5.6	17.9
Central	3.2	4.2	8.1
East Central	2.7	4.7	13.7
Southwest	2.9	5.2	21.6
South Central	4.2	6.4	30.0
Southeast	<u>3.6</u>	<u>5.6</u>	<u>21.6</u>
<b>Weighted average</b>	<b>3.2</b>	<b>5.0</b>	<b>15.7</b>

increase of 31 percent. Over three-fourths of this increase in the number of semis will be in the Northwest and North Central CRD's. Relatively small increases are expected in most other CRDs.

Table 17 presents a comparison of 1995 expectations for the number of vehicles owned by Iowa grain producers and the estimated number from this survey. Grain producers expected to double the number of owned semis from 6,200 in 1995 to 12,600 in 2000. And they almost met that expectation. The estimated number of semis owned in 2000 increased to 12,300.

In 1995, grain producers also expected to decrease the number of single and tandem axle trucks. The estimated number of single- and tandem-axle trucks owned in 2000 was almost identical to the number that 1995 grain producers expected to own in 2000. However, in 1995, Iowa grain producers expected to own 197,600 wagons in 2000, but they actually owned 233,400. One possible reason that producers did not reduce the number of wagons as expected is that the low market value of wagons motivates grain producers to keep the wagons even though they may not be fully utilized. Another possibility is that the number of grain carts increased sharply and that

**Table 16. Estimated number of vehicles owned on farms in 2000 and expected to be owned in the year 2005, by crop reporting district, in thousands of vehicles, Iowa.**

CRD	Number of vehicles									
	2000					2005				
	Wagons	Single- axle	Tandem- axle	Semi	Total	Wagons	Single- axle	Tandem- axle	Semi	Total
Northwest	37.2	2.8	1.0	1.2	42.3	29.5	1.5	1.5	2.3	34.7
North Central	34.3	1.1	2.9	2.1	40.5	20.6	0.4	1.9	3.9	26.9
Northeast	34.4	1.9	0.6	0.2	37.1	28.6	2.0	0.6	0.5	31.7
West Central	23.2	1.8	3.7	2.7	31.3	16.7	1.5	2.5	2.5	23.2
Central	25.4	3.4	3.7	2.4	34.8	22.9	2.4	3.4	2.6	31.3
East Central	26.4	1.4	1.6	1.3	30.7	19.5	1.1	1.3	1.6	23.4
Southwest	12.5	1.1	0.6	1.8	16.0	9.1	1.3	0.6	2.0	12.9
South Central	14.7	2.8	0.8	0.6	18.8	10.7	1.1	1.1	1.0*	13.9
Southeast	25.2	1.9	0.4	0.1	27.6	16.0	0.9	0.6	0.7	18.2
<b>Total</b>	<b>233.4</b>	<b>18.2</b>	<b>15.2</b>	<b>12.3</b>	<b>279.1</b>	<b>173.6</b>	<b>12.1</b>	<b>13.4</b>	<b>16.1</b>	<b>215.2</b>

\* Only one responding producer in the South Central CRD owned a semi and he expects to not operate it in 2005.

**Table 17. Comparison of 1995 expected and 2000 actual vehicle numbers in thousands by type of vehicle, Iowa.**

Type of vehicle	1995 estimate for 2000	Estimated actual number in 2000	Difference	
			Number of vehicles	Percent
Wagons	197,600	233,400	35,800	18.1
Single-axle trucks	18,000	18,200	200	1.1
Tandem-axle trucks	15,200	14,900	-300	-2.0
Semis	12,600	12,300	-300	-2.4
<b>Total</b>	<b>243,400</b>	<b>278,800</b>	<b>35,400</b>	<b>14.5</b>

average wagon size increased, thereby reducing the cost of hauling by tractor and wagons.

Table 18 shows the percentage of farms in 2000 by the largest vehicle owned and expected largest vehicle owned in 2005, grouped by number of acres of corn and soybeans produced. In the year 2000, 77 percent of farms with 250 or fewer corn and soybean acres owned only wagons to haul their grain.

Conversely, only 17 percent of 1,000+ acre farms owned only wagons and no trucks. Only 4 percent of the farms with 250 or fewer corn and soybean acres owned semis while 51 percent of the farms with 1,000+ corn and soybean acres owned semis.

In the year 2005, the percent of farms that own only wagons is expected to decline in all size groups. Conversely, the percent of farms owning semis is expected to increase in all farm size groups. The 1,000+ corn and soybean acre farms with semis is

expected to grow from 51 percent in 2000 to 69 percent in 2005.

Table 19 shows the percent of corn and soybeans delivered from farms by type of vehicle and acres of corn and soybeans. As expected, the percent of corn and soybeans delivered from farms by wagons ranged from about 50 percent for small farms to about 2 percent for large farms. Single axle trucks delivered 2-9 percent of the corn and 3-11 percent of the soybeans. However, the percent of corn and soybeans delivered by tandem-axle and semi trucks increased sharply as the number of acres of corn and soybeans increased. About 35 percent of corn and soybeans was hauled in semis from 1-250 acres of corn and soybeans. This suggests that smaller farms may be hiring rather than owning semis. These results suggest that if the farm size continues to grow, the percent of corn and soybeans delivered by semis could reach 60 percent or more by 2005.

**Table 18. Estimated percentage of corn and soybean producers grouped by the largest vehicle owned and by acres of grain production, Iowa, 2000 and 2005.**

<u>Acres of corn and soybeans</u>	<u>Percent</u>									
	<u>Largest vehicle owned in 2000</u>					<u>Largest vehicle to be owned in 2005</u>				
	<u>Single-</u>		<u>Tandem-</u>			<u>Single-</u>		<u>Tandem-</u>		
	<u>Wagons</u>	<u>axle</u>	<u>axle</u>	<u>Semi</u>	<u>Total</u>	<u>Wagons</u>	<u>axle</u>	<u>axle</u>	<u>Semi</u>	<u>Total</u>
1 - 250	77.0	13.4	5.5	4.1	100.0	73.3	14.4	6.4	5.9	100.0
251 - 500	58.2	20.9	9.3	11.6	100.0	40.6	11.9	22.8	24.8	100.0
501 - 1,000	42.1	17.9	20.0	20.0	100.0	32.4	14.9	17.6	35.1	100.0
1,001+	17.0	2.1	29.8	51.1	100.0	10.3	2.6	17.9	69.2	100.0

**Table 19. Estimated percent of corn and soybeans delivered from farms by type of vehicle and acres of corn and soybeans, Iowa, September 1, 1999, - August 31, 2000.**

<u>Acres of corn and soybeans</u>	<u>Percent</u>									
	<u>Percent of corn</u>					<u>Percent of soybeans</u>				
	<u>Single-</u>		<u>Tandem-</u>			<u>Single-</u>		<u>Tandem-</u>		
	<u>Wagons</u>	<u>axle</u>	<u>axle</u>	<u>Semi</u>	<u>Total</u>	<u>Wagons</u>	<u>axle</u>	<u>axle</u>	<u>Semi</u>	<u>Total</u>
1 - 250	46.2	9.2	10.0	34.8	100.0	52.4	11.2	9.7	26.7	100.0
251 - 500	38.4	7.9	16.4	37.3	100.0	45.9	11.3	15.7	27.1	100.0
501 - 1,000	31.9	8.4	17.5	42.2	100.0	36.6	10.2	13.2	40.0	100.0
1,001 +	2.1	2.2	27.4	68.3	100.0	2.2	3.1	25.2	69.5	100.0

## Country elevator survey

The country elevator survey data were collected by questionnaire from the list of all country elevator firms operating in Iowa. Table 20 shows the number of firms receiving the single mailing of questionnaires and the number of useable questionnaires returned. Statewide, 21.5 percent of the firms responded. Given that a single mailing will typically generate a 15 percent response rate with a simple questionnaire, the response rate to the country elevator survey was very good. The questionnaires were returned to the Iowa Agricultural Statistics Service where the data were coded and placed on a computer disk. The data were then analyzed and summarized by the authors of this report.

The conversion factor used to project the total amounts of corn and soybeans shipped to destination markets by country elevators was the total storage and estimated shipments of corn and soybeans from farms to country elevators in tables 6 and 11. Reported shipments are smaller than reported receipts because some of the receipts remained in storage. Therefore, reported total corn shipments from country elevators are lower than total corn shipments from farms to country elevators. However, total soybean shipments and receipts

follow each other closely and the total estimated soybean shipments from country elevators are exactly equal to estimated soybean shipments from farms to country elevators.

### *Corn flows by country elevators*

Table 21 presents the estimated quantities of corn shipped from country elevators by destination markets and crop reporting district in Iowa, for the September 1, 1999, - August 31, 2000, crop year. **State totals in these tables have a margin of error of approximately +5.0 percent at the 95 percent confidence level. Crop reporting district totals have larger margins of error varying inversely with the number of responses in each CRD.** The total amount of corn shipped by country elevators was 863 million bushels, down 16 percent from 1.03 billion bushels shipped in 1994-95. The 863 million bushels shipped is less than the estimated 903.1 millions bushels farmers hauled to country elevators.

Almost 44 percent, or 375 million, of the 863 million bushels of elevator shipments were shipped to corn processors. These shipments to processors were down by 152 million bushels from 1994-95 shipments, probably because of the smaller corn crop in 1999. Most of the 375 million bushels – 82 percent – went to Iowa processors. The second

**Table 20. Number of country elevators receiving questionnaires and number of useable questionnaires returned by crop reporting district in Iowa.**

<u>CRD</u>	<u>Number of questionnaires mailed</u>	<u>Number of useable questionnaires returned</u>	<u>Percent response</u>
Northwest	59	21	35.6
North Central	52	17	32.7
Northeast	81	16	19.8
West Central	49	12	24.5
Central	76	13	17.1
East Central	69	13	18.8
Southwest	39	5	12.8
South Central	21	5	23.8
Southeast	<u>60</u>	<u>7</u>	<u>11.6</u>
<b>Total</b>	<b>506</b>	<b>109</b>	<b>21.5</b>



**Table 21. Estimated quantities of corn shipped from country elevators by destination markets and crop reporting district, in millions of bushels, Iowa, September 1, 1999, – August 31, 2000.**

CRD	Millions of bushels											
	In-state feeders	Out-of-state feeders	In-state processors	Out-of-state processors	Illinois River	Mississippi River	Missouri River	Gulf Coast	West Coast	Mexico	Other	Total
Northwest	60.9	5.7	45.2	1.7	0.0	31.8	0.0	30.6	8.0	4.2	3.3	191.4
North Central	36.3	0.0	85.5	13.8	0.5	43.2	0.0	0.3	1.8	2.8	0.0	184.2
Northeast	9.2	0.1	24.6	0.2	0.0	21.4	0.0	0.0	0.0	0.0	0.0	55.5
West Central	23.2	11.6	1.6	37.6	0.0	0.0	3.0	15.6	2.4	2.9	0.0	97.9
Central	29.5	0.0	104.2	7.2	0.0	6.2	0.0	43.1	0.0	0.0	9.3	199.5
East Central	2.9	0.0	15.9	0.0	0.4	10.2	0.0	3.1	0.0	0.0	0.0	32.5
Southwest	13.7	15.2	0.4	6.5	0.0	0.0	0.8	0.7	0.0	0.8	0.0	38.1
South Central	5.2	0.9	11.3	0.5	0.0	0.2	2.9	0.0	0.0	0.0	0.0	21.0
Southeast	18.6	0.0	18.6	0.4	0.0	5.3	0.0	0.0	0.0	0.0	0.0	42.9
<b>Total</b>	<b>199.5</b>	<b>33.5</b>	<b>307.3</b>	<b>67.9</b>	<b>0.9</b>	<b>118.3</b>	<b>6.7</b>	<b>93.4</b>	<b>12.2</b>	<b>10.7</b>	<b>12.6</b>	<b>863.0</b>
<b>Percent</b>	<b>(23.1)</b>	<b>(3.9)</b>	<b>(35.6)</b>	<b>(7.9)</b>	<b>(0.1)</b>	<b>(13.7)</b>	<b>(0.8)</b>	<b>(10.8)</b>	<b>(1.4)</b>	<b>(1.2)</b>	<b>(1.5)</b>	<b>(100.0)</b>

largest receiver of country elevator corn shipments was feeders. In-state feeders received 200 million bushels and out-of-state feeders received about 33 million bushels totaling 233 million bushels of corn shipped by country elevators to feeders. This was up 23 million bushels from 1994-95.

The third largest receiver of country elevator shipped corn was the Mississippi River. The Mississippi River received 118 million bushels, or 13.7 percent of country elevator grain shipments. This is down from 176 million bushels from 1994-95, probably because of the smaller 1994 crop and declining corn exports.

The fourth largest receivers of direct country elevator shipments were the export ports on the Gulf Coast, West Coast and Mexico. These direct shipments totaled 116.3 million bushels or 13.4 percent of total country elevator shipments. These direct to export shipments were up 379 percent from the 24.3 million shipped direct to export ports in 1994-95. The direct to export port and Mexico shipments, mostly by railroad, were just slightly less than the 118 million bushels shipped by barge down the Mississippi River.

The fifth largest receivers of country elevator corn shipments were Missouri River elevators. Country

elevators shipped 6.7 million bushels of corn to Missouri River elevators in 1999-2000, down 72 percent from 24.3 million bushels in 1994-95.

According to grain industry sources, approximately 5 percent of Missouri River receipts are shipped by barge down the Missouri River. The remaining 95 percent is trucked to Kansas and Nebraska feeders or shipped by railroad to Mexico, to Gulf and West Coast export ports and to feeders in western and southwestern states.

Table 22 shows the quantities of corn shipped from country elevators by mode of transport. In September 1, 1999, - August 31, 2000, railroads hauled 57.3 percent and trucks carried 42.7 percent of the corn from country elevators to markets. This represents a large railroad gain in the market share. In 1994-95, railroads hauled 47.1 percent and trucks carried 52.9 percent. The largest quantities of rail shipments came from the North Central, Northwest, and Central CRDs. Two CRDs – Northeast and Southeast – reported no rail shipments. Country elevators shifted some corn to railroads to take advantage of cycle, shuttle and bullet trains priced to compete with barges. The country elevator shift to railroads suggests that local markets are increasingly served by producers trucking their grain directly to these markets.

**Table 22. Estimated quantities of corn shipped from country elevators by mode of transport and crop reporting district, in millions of bushels, Iowa, September 1, 1999, - August 31, 2000.**

<u>CRD</u>	<u>Millions of bushels</u>		
	<u>Trucks</u>	<u>Rail</u>	<u>Total</u>
Northwest	68.3	123.1	191.4
North Central	38.4	145.8	184.2
Northeast	55.5	0.0	55.5
West Central	30.5	67.4	97.9
Central	82.8	116.7	199.5
East Central	17.7	14.8	32.5
Southwest	15.3	22.8	38.1
South Central	16.7	4.3	21.0
Southeast	<u>42.9</u>	<u>0.0</u>	<u>42.9</u>
<b>Total</b>	<b>368.1</b>	<b>494.9</b>	<b>863.0</b>
<b>Percent</b>	<b>(42.7)</b>	<b>(57.3)</b>	<b>(100.0)</b>

Table 23 shows the quantity of country elevator corn shipments to alternative markets by mode of transport. Trucks dominated the movement of corn to in-state feeders, hauled large quantities to in-state processors, and to the Mississippi River. Railroads dominated the movement of corn from country elevators to all markets except to in-state feeders. Railroads hauled large quantities to in-state and out-of-state processors, the Mississippi River and to major export markets. The increased rail shipments direct to major export markets reflect the competitiveness of railroad pricing designed to compete with barges.

Table 24 shows the average distance that corn was hauled from each CRD. Trucks hauled corn a statewide average distance of 43.5 miles from country elevators to markets. The average range varied from 24 miles from the East Central CRD to almost 100 miles from the North Central CRD. These miles suggest that the economic distance for truck deliveries of grain ranges up to about 100 miles.

Railroads, on the other hand, hauled corn much longer distances. The average distance corn was

hauled by rail was 527 miles with average distances ranging from 87 miles in the South Central CRD to 830 miles from the West Central CRD. Truck competition seems to eliminate railroad movements from distances of fewer than 100 miles.

**Table 23. Estimated quantities of corn shipped from country elevators to destination markets by mode of transport in millions of bushels, Iowa, September 1, 1999, - August 31, 2000.**

<u>Markets</u>	<u>Bushels</u>		
	<u>Trucks</u>	<u>Rail</u>	<u>Total</u>
In-state feeders	199.3	0.2	199.5
Out-of-state feeders	3.6	29.9	33.5
In-state processors	115.3	192.0	307.3
Out-of-state processors	6.2	61.7	67.9
Illinois River	0.0	0.9	0.9
Mississippi River	36.9	81.4	118.3
Missouri River	3.8	2.9	6.7
Gulf Coast	0.0	93.4	93.4
West Coast	0.0	12.2	12.2
Mexico	0.0	10.7	10.7
Other	<u>3.0</u>	<u>9.6</u>	<u>12.6</u>
<b>Total</b>	<b>368.1</b>	<b>494.9</b>	<b>863.0</b>

**Table 24. Estimated average distance corn was hauled from country elevators in miles by mode of transport and crop reporting district, Iowa, September 1, 1999, - August 31, 2000.**

<u>CRD</u>	<u>Miles</u>	
	<u>Trucks</u>	<u>Rail</u>
Northwest	35.9	684.7
North Central	99.4	313.8
Northeast	39.7	0.0
West Central	76.9	830.0
Central	65.1	758.3
East Central	23.6	393.3
Southwest	39.3	625.0
South Central	72.5	87.5
Southeast	<u>39.2</u>	<u>0.0</u>
<b>Average</b>	<b>43.5</b>	<b>527.2</b>

## Soybean flows

Table 25 shows the quantities of soybeans shipped from country elevators to alternative markets. A total of 267 million bushels or 80 percent of the soybeans shipped from country elevators were delivered to processors. Soybean shipments to processors were down 50 million bushels from the 317 million bushels shipped to processors in 1994-95. Over 71 percent of the total soybean shipments were delivered to Iowa processors and 9 percent went to out-of-state processors. Almost eight percent of the soybeans shipped from country elevators to processors was for human consumption.

The second largest quantity – 36 million bushels or 10.8 percent – of soybeans shipped from country elevators went to the Mississippi River to be transported by barge to New Orleans for export. This was down from 49 million bushels to the Mississippi River in 1994-95. One of the reasons for this decline is that producer deliveries direct to the Mississippi River were up by over 8 million bushels from 1994-95. Another reason is that the third largest quantity — 24.6 million bushels or 7.4 percent — was shipped by rail to Gulf export ports or directly to Mexico.

Direct shipments to export ports by rail were up almost 19 million bushels from 1994-95.

Table 26 shows the truck and railroad shares of soybean shipments from country elevators. Trucks clearly dominated the movements of soybeans in Iowa, hauling more than 82 percent of all soybean shipments from Iowa country elevators, mostly to nearby processing plants. In the 1994-95 crop year, country elevators shipped 391 million bushels of soybeans compared to 331 million in the 1999-2000 crop year. Iowa farmers harvested about 8 percent more soybeans in 1999 than in 1994. Country elevators received about the same number of bushels of soybeans in both years. Thus the extra 60 million bushels of soybeans shipped in 1994 came from soybeans stored from previous crops or more of the 1994 soybean crop was stored into the 2000-2001 crop year.

During September 1, 1999, - August 31, 2000, truck shipments of soybeans from country elevators were down about 12 million bushels from 1994-1995, while rail shipments were down 56 percent to only 60 million bushels. One of the reasons for the decline in truck and rail shipments is the increased deliveries direct from farms to the Mississippi River.

**Table 25. Estimated quantities of soybeans shipped from country elevators by destination markets and crop reporting district, in millions of bushels, Iowa, September 1, 1999, – August 31, 2000.**

CRD	Millions of bushels									
	In-state processors		Out-of-state processors		Mississippi River	Missouri River	Gulf Coast	Mexico	Other	Total
	Human consumption	Non-human consumption	Human consumption	Non-human consumption						
Northwest	0.6	42.7	4.8	1.5	2.6	0.0	8.5	4.9	0.0	65.6
North Central	1.4	45.1	0.0	2.5	3.0	0.0	0.0	1.6	0.0	53.6
Northeast	0.1	12.9	0.0	0.0	12.5	0.0	0.0	0.0	0.0	25.5
West Central	6.1	28.1	6.1	6.1	0.0	0.0	0.0	6.6	0.0	53.0
Central	3.1	62.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	65.9
East Central	0.1	9.6	0.0	0.0	3.8	0.0	0.0	0.0	0.0	13.5
Southwest	0.0	18.9	0.4	0.4	0.0	0.0	3.0	0.0	1.2	23.9
South Central	0.0	2.9	3.0	1.9	0.0	3.0	0.0	0.0	0.0	10.8
Southeast	0.0	2.6	0.0	3.9	13.2	0.0	0.0	0.0	0.0	19.7
<b>Total</b>	<b>11.4</b>	<b>224.8</b>	<b>14.3</b>	<b>16.3</b>	<b>35.9</b>	<b>3.0</b>	<b>11.5</b>	<b>13.1</b>	<b>1.2</b>	<b>331.5</b>
<b>Percent</b>	<b>(3.4)</b>	<b>(67.8)</b>	<b>(4.3)</b>	<b>(4.9)</b>	<b>(10.8)</b>	<b>(0.9)</b>	<b>(3.5)</b>	<b>(4.0)</b>	<b>(0.4)</b>	<b>(100.0)</b>

**Table 26. Estimated quantities of soybeans shipped from country elevators by mode of transport and crop reporting district, in millions of bushels, Iowa, September 1, 1999, – August 31, 2000.**

<u>CRD</u>	<u>Millions of bushels</u>		
	<u>Trucks</u>	<u>Rail</u>	<u>Total</u>
Northwest	41.2	24.4	65.6
North Central	45.3	8.3	53.6
Northeast	25.5	0.0	25.5
West Central	34.3	18.7	53.0
Central	65.9	0.0	65.9
East Central	13.3	0.2	13.5
Southwest	19.7	4.2	23.9
South Central	7.1	3.7	10.8
Southeast	<u>19.7</u>	<u>0.0</u>	<u>19.7</u>
<b>Total</b>	<b>272.0</b>	<b>59.5</b>	<b>331.5</b>
<b>Percent</b>	<b>(82.0)</b>	<b>(18.0)</b>	<b>(100.0)</b>

A second reason is that country elevators shipped fewer total bushels of soybeans in 1990-2000 compared to 1994-1995.

The Northwest and West Central CRDs shipped over 72 percent of all railroad soybean shipments. Three CRDs shipped all of their soybeans by truck. Most of the Northeast and Southeast soybeans were delivered to the Mississippi River and to processors, while most of the Central CRD soybeans were delivered to processors.

Table 27 shows the quantities of soybeans shipped from country elevators by market destinations and mode of transport. Trucks clearly dominated the shipments to in-state processors, hauling almost 98 percent of these shipments. Trucks also hauled 85 percent of the soybeans to Mississippi River barge terminals. Railroads, on the other hand, hauled 100 percent of the direct shipments to Gulf ports, Mexico, and the Illinois and Missouri rivers. They also hauled almost 65 percent of the shipments to out-of-state processors. Three CRDs, with zero bushels transported by rail, are the Northeast and Southeast CRD, located close to Mississippi River barge terminals, and the Central CRD which contains several large soybean processing plants.

Table 28 shows the average distance that soybeans were hauled from country elevators by mode of transport. Truck shipments averaged almost 54 miles and railroad shipments averaged 639 miles. The 92.4 truck miles from the North Central CRD again suggests that trucks can economically haul

**Table 27. Estimated quantities of soybeans shipped from country elevators to destination markets by mode of transport in millions of bushels, Iowa, September 1, 1999, – August 31, 2000.**

<u>Markets</u>	<u>Millions of bushels</u>		
	<u>Trucks</u>	<u>Rail</u>	<u>Total</u>
In-state processors	230.6	5.7	236.3
Out-of-state processors	10.9	19.6	30.5
Illinois River	0.0	1.2	1.2
Mississippi River	30.5	5.4	35.9
Missouri River	0.0	3.0	3.0
Gulf Coast	0.0	11.5	11.5
West Coast	0.0	0.0	0.0
Mexico	<u>0.0</u>	<u>13.1</u>	<u>13.1</u>
<b>Total</b>	<b>272.0</b>	<b>59.5</b>	<b>331.5</b>
<b>Percent</b>	<b>(82.0)</b>	<b>(18.0)</b>	<b>(100.0)</b>

**Table 28. Estimated average distance soybeans were hauled from country elevators in miles by mode of transport and crop reporting district, Iowa, September 1, 1999, – August 31, 2000.**

<u>CRD</u>	<u>Miles</u>	
	<u>Trucks</u>	<u>Rail</u>
Northwest	40.9	841.1
North Central	92.4	476.5
Northeast	62.8	0.0
West Central	37.1	700.0
Central	68.3	0.0
East Central	36.2	50.0
Southwest	64.0	900.0
South Central	81.7	100.0
Southeast	<u>83.9</u>	<u>0.0</u>
<b>Average</b>	<b>53.6</b>	<b>639.0</b>

Iowa corn and soybeans up to about 100 miles. Beyond that distance, railroads are more economical than trucks. However, country elevators from the East Central CRD reported shipping a small quantity of soybeans 50 miles by railroad.

## Combined corn and soybean shipments

Table 29 shows total corn shipments from farms and country elevators by destination. Shipments from farms to country elevators were excluded from tables 29 and 30 to avoid double counting.

Total corn shipments to processors were 551 million bushels or 42 percent of all shipments. Feeders received the second largest share of corn shipments, totaling 301 million bushels or 23 percent of total shipments. The Mississippi River received the third largest share – 246.5 million bushels or 18.7 percent of total shipments. Direct rail shipments to the Gulf Coast, West Coast, and to Mexico totaled 116 million bushels or 8.8 percent of total shipments.

Total corn shipments to processors were down 15 percent from the September 1, 1994, — August 31, 1995, crop year and total corn shipments to the Mississippi River were down 28 percent from the

same crop year. The decline in processor and Mississippi River corn shipments was likely because of the smaller crop in 1999 and reduced ethanol production in the summer of 2000. In addition, corn shipments to the Mississippi River were down because of declining corn exports and a sharp increase in rail shipments direct to export ports.

Table 30 shows total soybean shipments from farms and country elevators by destination. Processors received over two-thirds or 302 million bushels of the soybeans shipped from country elevators and from farms – down slightly from 315 million bushels in the September 1, 1994, – August 31, 1995, crop year. Approximately 28.2 million bushels or 6.3 percent of total soybean shipments were for human consumption.

The Mississippi River received almost 80 million bushels of soybeans or 17.8 percent of total shipments. This was down slightly from 87 million bushels in the September 1, 1994, – August 31, 1995, crop year, even though the 1999 crop was 8 percent larger than the 1994 crop. Direct rail shipments for export to the Gulf Coast and to Mexico totaled 24.6 million bushels or 5.5 percent of total soybean shipments, about the same as in the September 1, 1994, – August 31, 1995, crop year.

**Table 29. Total corn shipments by producers and elevators by destination and crop reporting district, in millions of bushels, Iowa, September 1, 1999, – August 31, 2000.**

CRD	Millions of bushels											
	In-state feeders	Out-of- state feeders	In-state pro- cessors	Out-of- state processors	Illinois River	Mississ- ippi River	Missouri River	Gulf Coast	West Coast	Mexico	Other and unknown	Total
Northwest	79.7	5.7	52.6	1.7	0.0	31.8	0.0	30.6	8.0	4.2	6.8	221.0
North Central	43.0	0.0	87.9	15.6	0.5	46.6	0.0	0.3	1.8	2.8	2.3	200.8
Northeast	10.8	0.2	55.0	1.2	0.0	86.0	0.0	0.0	0.0	0.0	1.1	154.2
West Central	43.4	13.4	14.4	59.2	0.0	1.1	9.7	15.6	2.4	2.9	0.4	162.6
Central	31.3	0.0	124.8	7.3	0.0	6.2	0.0	43.1	0.0	0.0	10.4	223.3
East Central	16.8	0.1	44.0	1.2	2.4	65.9	0.0	3.1	0.0	0.0	3.7	137.2
Southwest	14.2	18.0	10.1	11.3	0.0	0.0	50.8	0.7	0.0	0.8	1.1	107.0
South Central	5.2	1.0	20.3	0.6	0.0	0.2	7.8	0.0	0.0	0.0	3.6	38.7
Southeast	18.6	0.0	41.8	1.5	0.0	8.7	0.0	0.0	0.0	0.0	2.1	72.7
<b>Total</b>	<b>263.0</b>	<b>38.3</b>	<b>450.9</b>	<b>99.7</b>	<b>2.9</b>	<b>246.5</b>	<b>68.3</b>	<b>93.4</b>	<b>12.2</b>	<b>10.7</b>	<b>31.5</b>	<b>1317.6</b>
<b>Percent</b>	<b>(20.0)</b>	<b>(2.9)</b>	<b>(34.2)</b>	<b>(7.6)</b>	<b>(0.2)</b>	<b>(18.7)</b>	<b>(5.2)</b>	<b>(7.1)</b>	<b>(0.9)</b>	<b>(0.8)</b>	<b>(2.4)</b>	<b>(100.0)</b>

**Table 30. Total soybean shipments by producers and elevators by destination and crop reporting district, in millions of bushels, Iowa, September 1, 1999, – August 31, 2000.**

CRD	Millions of bushels									
	In-state processors		Out-of-state processors		Mississippi River	Missouri River	Gulf Coast	Mexico	Other and unknown	Total
	For human consumption	For non-human consumption	For human consumption	For non-human consumption						
Northwest	0.6	47.5	4.8	1.5	2.6	0.0	8.5	4.9	4.6	75.0
North Central	1.7	46.9	0.0	2.5	3.7	0.0	0.0	1.6	33.2	59.6
Northeast	0.2	13.6	0.2	0.0	24.2	0.0	0.0	0.0	6.6	44.8
West Central	6.1	31.2	6.1	7.5	0.7	0.4	0.0	6.6	5.8	64.4
Central	3.3	65.9	0.1	0.0	0.8	0.0	0.0	0.0	5.4	75.5
East Central	0.7	12.9	0.0	0.0	27.2	0.0	0.0	0.0	1.3	42.1
Southwest	0.0	31.1	0.4	0.6	0.0	1.2	3.0	0.0	2.1	38.4
South Central	0.5	4.1	3.5	1.9	0.1	4.6	0.0	0.0	1.9	16.6
Southeast	0.0	3.0	0.0	3.9	20.4	0.0	0.0	0.0	4.3	31.6
<b>Total</b>	<b>13.1</b>	<b>256.2</b>	<b>15.1</b>	<b>17.9</b>	<b>79.7</b>	<b>6.2</b>	<b>11.5</b>	<b>13.1</b>	<b>35.2</b>	<b>448.0</b>
<b>Percent</b>	<b>(2.9)</b>	<b>(57.2)</b>	<b>(3.4)</b>	<b>(4.0)</b>	<b>(17.8)</b>	<b>(1.4)</b>	<b>(2.6)</b>	<b>(2.9)</b>	<b>(7.9)</b>	<b>(100.0)</b>

Table 31 shows the truck and rail shares of corn shipments to non-country elevator markets. Shipments from farms to country elevators were excluded from tables 31 and 32 to avoid double counting. Trucks hauled almost three-fifths (62.4 percent) of all corn shipments to markets while railroads hauled the remaining 37.6 percent. Over 90 percent of all railroad shipments of corn originated in the northwest quadrant of Iowa, including the Northwest, North Central, Central and West Central CRDs.

Table 22 shows that trucks hauled only 42.7 percent of the corn shipped from country elevators. The difference between the 62.4 percent truck share in table 31 and the 42.7 percent truck share in table 22 is that all corn hauled directly from farms to markets is hauled by truck (including wagons). As farmers continue to buy more semis, the truck share of corn shipments to markets is likely to increase.

Table 32 shows the truck and rail shares of soybeans to non-country elevator markets. Trucks dominated the movement of soybeans with an 86.7 share of total shipments. Trucks (including wagons) haul 100 percent of the soybeans from farms to markets and dominate the shipments of soybeans from elevators to Iowa processors and to the Mississippi

River. Table 27 shows that railroads dominated the movement of soybeans to out-of-state processors and direct shipments from country elevators to Gulf ports and to Mexico.

**Table 31. Total corn shipments by producers and elevators to non-country elevator markets by mode of transport and crop reporting district, in millions of bushels, Iowa, September 1, 1999, – August 31, 2000.**

CRD	Millions of bushels		
	Trucks	Rail	Total
Northwest	97.9	123.1	221.0
North Central	55.1	145.7	200.8
Northeast	154.2	0.0	154.2
West Central	95.2	67.4	162.6
Central	106.6	116.7	223.3
East Central	122.4	14.8	137.2
Southwest	84.3	22.7	107.0
South Central	34.4	4.4	38.7
Southeast	72.7	0.0	72.7
<b>Total</b>	<b>822.8</b>	<b>494.9</b>	<b>1,317.6</b>
<b>Percent</b>	<b>(62.4)</b>	<b>(37.6)</b>	<b>(100.0)</b>

**Table 32. Total soybean shipments by producers and elevators to non-country elevator markets by mode of transport and crop reporting district, in millions of bushels, Iowa, September 1, 1999, – August 31, 2000.**

<u>CRD</u>	<u>Millions of bushels</u>		
	<u>Trucks</u>	<u>Rail</u>	<u>Total</u>
Northwest	50.6	24.4	75.0
North Central	51.4	8.2	59.6
Northeast	44.8	0.0	44.8
West Central	45.7	18.7	64.4
Central	75.5	0.0	75.5
East Central	42.0	0.1	42.1
Southwest	34.2	4.2	38.4
South Central	12.8	3.8	16.6
Southeast	<u>31.6</u>	<u>0.0</u>	<u>31.6</u>
<b>Total</b>	<b>388.6</b>	<b>59.4</b>	<b>448.0</b>
<b>Percent</b>	<b>(86.7)</b>	<b>(13.3)</b>	<b>(100.0)</b>

**Table 33. Estimated percent of grain producers containerizing corn or soybeans and quantities shipped, in millions of bushels, by crop reporting district, Iowa, September 1, 1999, – August 31, 2000.**

<u>CRD</u>	<u>Percent of farmers containerizing</u>		<u>Millions of bushels containerized</u>	
	<u>Soy-</u>		<u>Soy-</u>	
	<u>Corn</u>	<u>beans</u>	<u>Corn</u>	<u>beans</u>
Northwest	0.7	1.2	1.5	0.9
North Central	1.7	0.0	3.5	0.0
Northeast	0.6	0.0	1.0	0.0
West Central	4.5	0.9	7.4	0.6
Central	0.0	0.3	0.0	0.2
East Central	2.4	3.0	3.3	1.2
Southwest	2.5	2.7	2.6	1.0
South Central	13.4	7.4	5.3	1.2
Southeast	<u>1.6</u>	<u>1.2</u>	<u>1.2</u>	<u>0.4</u>
<b>Total</b>	<b>1.8</b>	<b>1.2</b>	<b>25.8</b>	<b>5.5</b>

## Grain marketing practices by grain producers

Table 33 shows the percent of grain producers containerizing corn or soybeans and the number of bushels containerized. About 1.8 percent or about 1,125 Iowa grain producers were estimated to have containerized corn. Producers are estimated to have containerized about 25.8 million bushels of corn or about 1.5 percent of the total 1999 corn crop. About 29 percent of the containerized corn was shipped from the West Central CRD.

Approximately 1.2 percent or 750 grain producers containerized about 5.5 million bushels of soybeans — about 1.1 percent — of the 1999 soybean crop. About 62 percent of these containerized soybeans came from the East Central, South Central and Southwest CRDs.

Table 34 shows the bushels of corn and soybeans containerized by country elevators in 1999-2000 and the quantities expected to be containerized in 2005. In the September 1, 1999, - August 31, 2000, crop year, country elevators containerized 1.7 million bushels of corn or 0.1 percent of total elevator corn

**Table 34. Estimated quantities of corn and soybeans containerized by country elevators September 1, 1999, - August 31, 2000 and expected to be containerized in 2005, in millions of bushels, by crop reporting district, Iowa.**

<u>CRD</u>	<u>Millions of bushels</u>			
	<u>1999-2000</u>		<u>2005</u>	
	<u>Corn</u>	<u>beans</u>	<u>Corn</u>	<u>beans</u>
Northwest	1.5	0.1	0.0	34.3
North Central	0.0	3.3	0.0	4.3
Northeast	0.2	0.0	0.2	0.0
West Central	0.0	0.0	0.2	0.1
Central	0.0	0.0	0.0	0.0
East Central	0.0	0.0	0.0	0.0
Southwest	0.0	0.0	0.0	0.0
South Central	0.0	0.0	0.0	0.0
Southeast	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
<b>Total</b>	<b>1.7</b>	<b>3.4</b>	<b>0.4</b>	<b>38.7</b>

marketings. They expect to containerize even less in 2005. Country elevators containerized 3.4 million bushels of soybeans in 1999-2000 or 1.0 percent of total marketings. Country elevator managers expect containerization of corn will decline in 2005, but soybean containerization will increase dramatically to 38.7 million bushels in 2005. This would be a 10.4 fold increase in soybean containerization.

Table 35 shows the estimated percent of grain producers who were able to segregate grain by specific traits in 2000 and expect to be able to segregate grains in 2005. Almost one-third – 31.9 percent – of Iowa grain producers indicated that they are able to segregate grain by specific traits. By 2005, the percent is expected to decline to 28.2 percent. One possible reason for the decline in the number of producers segregating grain is that the average age of Iowa farmers is about 54 years; therefore, some producers may expect to be no longer farming in 2005.

Table 36 shows the estimated percent of grain producers using the Internet to market corn and soybeans and the percent of bushels marketed. Less than one-third of one percent of Iowa grain producers are estimated to use the Internet to market their grain. All of the Internet users are located in the Central CRD. Perhaps the major reason why all the producers using the Internet are located in the Central CRD is that a major e-market firm is located in that area. These producers marketed a very small amount via the Internet, totaling only five one-thousandths of one percent of the corn and 16 one-thousandths of one percent of the soybeans.

**Table 35. Estimated percent of producers able to segregate grain in 2000 and expected to be able to segregate grain by specific traits in 2005, by crop reporting district, Iowa.**

<u>CRD</u>	<u>Percent</u>	
	<u>2000</u>	<u>2005</u>
Northwest	34.0	34.4
North Central	36.9	33.3
Northeast	26.8	22.4
West Central	26.4	25.8
Central	41.3	32.4
East Central	27.0	24.6
Southwest	37.5	31.8
South Central	32.6	24.4
Southeast	<u>24.6</u>	<u>21.4</u>
<b>Average</b>	<b>31.9</b>	<b>28.2</b>

**Table 36. Estimated percent of producers using the Internet to market corn and soybeans and estimated percent marketed through the Internet by crop reporting district, Iowa, September 1, 1999, – August 31, 2000.**

<u>CRD</u>	<u>Percent</u>		
	<u>Producers</u>	<u>Corn</u>	<u>Soybeans</u>
Northwest	0.0	0.0000	0.0000
North Central	0.0	0.0000	0.0000
Northeast	0.0	0.0000	0.0000
West Central	0.0	0.0000	0.0000
Central	2.5	0.0032	0.0020
East Central	0.0	0.0000	0.0000
Southwest	0.0	0.0000	0.0000
South Central	0.0	0.0000	0.0000
Southeast	<u>0.0</u>	<u>0.0000</u>	<u>0.0000</u>
<b>CRD</b>	0.3	0.0005	0.0016



## Grain marketing practices by country elevators

Table 37 shows the percent of country elevators that were able to segregate grain in 2000 and the percent that expect to be able to segregate grain by specific traits in 2005. In 2000, 28.7 percent of the country elevators could segregate grain by specific traits.

The highest percentage — 47 percent — was in the North Central CRD and the lowest percent — 7.7 percent — was in the Central CRD. By 2005, over half of the elevators expect to be able to segregate by traits. All CRDs, except in the West Central CRD, are expected to increase the percent of elevators capable of segregating by specific traits.

Table 38 shows the percent of country elevators that used the Internet and the bushels marketed through the Internet in the September 1, 1999, - August 31, 2000, crop year. Less than four percent of the elevators used the Internet to market grain. These elevators marketed 3.9 million bushels (0.3 percent) of corn and 0.2 million bushels (0.04 percent) of the soybeans sold during the September 1, 1999, - August 31, 2000, crop year. In conclusion, only a very small percent of producers and country elevators market a very small percent of the corn and soybeans via the Internet.

Table 39 shows quantities and percents of total corn and soybean production that are further processed in Iowa. Further processing is defined as:

- fed in Iowa
- processed in Iowa including processed on farm
- placed in a container for shipment.

Placed in a container for further shipment is assumed to be a form of further processing above shipping in bulk by truck, barge, or rail.

In the September 1, 1999, - August 31, 2000, crop year, a total of 1,003 million bushels of corn and 282 million bushels of soybeans were further processed in Iowa. This represents 57 percent of the total 1999 Iowa corn production and 59 percent of total 1999 soybean production. The percent of corn production that will be processed in Iowa is expected to increase if all of the ethanol corn processing plants that are being planned for construction in Iowa are actually built.

**Table 37. Estimated percentage of country elevators that were capable of segregating grain by specific traits in 2000 and the percentage expected to be able to segregate grain in 2005 by crop reporting district, Iowa.**

CRD	Percent	
	2000	2005
Northwest	42.9	66.7
North Central	47.1	81.3
Northeast	18.8	50.0
West Central	25.0	25.0
Central	7.7	33.3
East Central	15.4	45.5
Southwest	20.0	40.0
South Central	25.0	50.0
Southeast	42.9	66.7
<b>Average</b>	<b>28.7</b>	<b>53.5</b>

**Table 38. Estimated percentage of country elevators using the Internet to market grain and the estimated bushels of corn and soybeans marketed through the Internet by these elevators in millions of bushels by crop reporting district, Iowa, September 1, 1999, - August 31, 2000.**

CRD	Percent of elevators using the internet	Millions of bushels	
		Corn	Soybeans
Northwest	9.5	2.7	0.0
North Central	0.0	0.0	0.0
Northeast	6.7	0.7	0.0
West Central	0.0	0.0	0.0
Central	0.0	0.0	0.0
East Central	8.3	0.4	0.2
Southwest	0.0	0.0	0.0
South Central	0.0	0.0	0.0
Southeast	0.0	0.0	0.0
<b>Total</b>	<b>3.9</b>	<b>3.9</b>	<b>0.2</b>

**Table 39. Estimated quantities and percents of further processed corn and soybeans in Iowa by crop reporting district, in millions of bushels, September 1, 1999, – August 31, 2000.**

CRD	Corn		Soybeans	
	Millions of bushels	Percent of 1999 production	Millions of bushels	Percent of 1999 production
Northwest	177.9	60.3	49.1	59.9
North Central	163.4	65.3	55.5	84.8
Northeast	103.7	47.5	14.0	31.1
West Central	115.6	45.3	38.0	54.4
Central	177.4	66.8	69.4	91.4
East Central	101.4	53.2	14.9	30.9
Southwest	41.5	33.2	32.1	81.5
South Central	38.6	68.2	5.9	28.6
Southeast	<u>83.6</u>	<u>82.4</u>	<u>3.4</u>	<u>10.6</u>
<b>Total</b>	<b>1,003.1</b>	<b>57.1</b>	<b>282.3</b>	<b>59.0</b>

## Feed transportation

Table 40 shows the number of feed delivery trucks owned by country elevators in 2000 and the number expected to be owned in 2005. In 2000, country elevators owned 751 feed delivery trucks. Almost three-fourths of the fleet was 6-ton single-axle and 12-ton tandem-axle trucks.

The total fleet size is expected to decline from 751 trucks in 2000 to about 653 in 2005. The numbers

**Table 40. Estimated total number and percent of feed delivery trucks owned by country elevators in 2000 and expected to be owned in the year 2005, by size of truck and crop reporting district, Iowa.**

Size of feed truck	Percent			
	Total fleet in 2000		Expected in 2005	
	Number	Percent	Number	Percent
6-ton single-axle	267	35.5	164	25.1
12-ton tandem-axle	274	36.5	216	33.1
18-ton triple-axle	103	13.7	108	16.5
24-ton semis	<u>107</u>	<u>14.3</u>	<u>165</u>	<u>25.3</u>
<b>Total</b>	<b>751</b>	<b>100.0</b>	<b>653</b>	<b>100.0</b>

of 6-ton and 12-ton trucks are expected to decline sharply by 2005. Eighteen-ton trucks are expected to increase modestly and semis are expected to increase by 54 percent. This means that there will be fewer but larger feed trucks owned by country elevators in 2005. However, the larger sizes of the fewer feed trucks translate into an increase in hauling capacity.

Table 41 shows the number of feed trucks by size and crop reporting district. Over three-fourths of the semis owned by country elevators in 2000 are located in the Northwest, North Central, and West Central CRDs. By 2005, country elevators in the Northwest, Northeast, West Central and Southeast expect to increase the number of feed semis sharply. These four areas have high concentrations of confinement livestock production. The Southwest and South Central sample reported no semis in 2000 and expect to have no semis in 2005.

Table 42 shows the average and maximum distances feed trucks travel. As expected, 6-ton trucks are used for short distance deliveries with an average of 10-miles. Twelve- and 18-ton trucks average about 16-mile delivery distances. Semis average significantly longer distances – 45 miles. The 24-ton capacity of semis makes these longer distance deliveries economical. The data in tables 40, 41, and 42 indicate that, in the future, feed will be delivered in larger trucks traveling longer distances. This suggests a major restructuring of the feed business is under way in Iowa.

Table 43 shows the average maximum width and length of grain – and feed – hauling trucks than can be accommodated by country elevators. The average length is 62-feet and average width is 11-feet. However, the average lengths vary widely, ranging from 53-feet in the East Central to 81-feet in the South Central CRDs.

**Table 41. Estimated number of feed delivery trucks owned in 2000 and expected to be owned in the year 2005, by size of truck and crop reporting district, Iowa.**

CRD	Number							
	2000				2005			
	6-ton	12-ton	18-ton	24-ton	6-ton	12-ton	18-ton	24-ton
Northwest	44	52	17	13	27	41	19	30
North Central	23	23	10	54	17	17	10	55
Northeast	50	71	7	7	44	40	27	20
West Central	36	28	19	17	32	23	17	34
Central	59	46	26	7	33	26	20	7
East Central	10	7	3	0	6	7	4	1
Southwest	0*	4*	0*	0*	0*	0*	0*	0*
South Central	8	16	3	0	5	16	3	0
Southeast	<u>37</u>	<u>27</u>	<u>18</u>	<u>9</u>	<u>0</u>	<u>46</u>	<u>9</u>	<u>18</u>
<b>Total</b>	<b>267</b>	<b>274</b>	<b>103</b>	<b>107</b>	<b>164</b>	<b>216</b>	<b>108</b>	<b>165</b>
<b>Percent</b>	<b>(35.5)</b>	<b>(36.5)</b>	<b>(13.7)</b>	<b>(14.3)</b>	<b>(25.1)</b>	<b>(33.1)</b>	<b>(16.5)</b>	<b>(25.3)</b>

\*The very low number of feed trucks in the Southwest CRD is probably the result of the small number of responses from this CRD.

**Table 42. Estimated average and maximum distances feed delivery trucks travel by size of vehicle and crop reporting district, Iowa, September 1, 1999, – August 31, 2000.**

CRD	Miles							
	6-ton		12-ton		18-ton		24-ton	
	Average	Longest	Average	Longest	Average	Longest	Average	Longest
Northwest	9.3	17.6	12.1	30.7	13.8	36.7	20.8	47.5
North Central	9.3	24.1	11.3	25.0	15.0	27.5	24.0	96.3
Northeast	11.3	29.4	21.8	50.4	22.5	47.5	20.0	50.0
West Central	13.3	30.0	18.3	39.3	20.0	41.7	128.3	142.5
Central	8.9	23.5	13.3	33.3	15.0	50.0	20.0	27.5
East Central	9.1	21.3	10.3	23.3	14.3	31.7	0.0	0.0
Southwest	0.0	0.0	15.0	15.0	0.0	0.0	0.0	0.0
South Central	12.0	30.0	10.5	25.0	0.0	0.0	0.0	0.0
Southeast	<u>5.0</u>	<u>20.0</u>	<u>38.3</u>	<u>80.0</u>	<u>20.0</u>	<u>50.0</u>	<u>30.0</u>	<u>50.0</u>
<b>Average</b>	<b>10.0</b>	<b>24.3</b>	<b>16.0</b>	<b>36.8</b>	<b>16.1</b>	<b>38.9</b>	<b>44.6</b>	<b>77.5</b>

**Table 43. Average maximum length and width of grain delivery equipment that elevators can handle by crop reporting district, Iowa, September 1, 1999, – August 31, 2000.**

	<u>Average maximum length in feet</u>	<u>Average maximum width in feet</u>
Northwest	59.4	11.7
North Central	65.5	10.6
Northeast	60.6	10.3
West Central	60.3	11.5
Central	70.2	10.1
East Central	53.5	12.2
Southwest	58.0	10.0
South Central	81.3	10.5
Southeast	<u>64.2</u>	<u>10.8</u>
<b>Average</b>	<b>62.5</b>	<b>11.0</b>

# Conclusions

## *I – Farm-to-market survey*

### **A – Summary of the results**

1. Statewide, 67 percent of the corn and 74 percent of the soybeans were delivered from farms to country elevators. The remainder was shipped directly to processors, barge terminals, export ports, and feeder markets. The corn shipments to country elevators were down from 70 percent in 1994-95, while the share of the soybeans delivered to elevators was identical to 1994-95.
2. Forty-eight percent of the corn and 45 percent of the soybeans were hauled from farms in semis, up from 37 and 31 percent respectively in 1994-95.
3. The average distance corn and soybeans were delivered off farms in semis was about 25 miles compared to 5 miles in wagons and about 8 miles in single-axle trucks.
4. The percent of corn and soybeans delivered from farms in semis increased with the size of farms, where size is measured by the number of acres of corn and soybeans produced.
5. Only a very small percent of grain producers sell grain over the internet.

### **B – Conclusions**

1. Country elevators are still the dominant market for producer delivered grain. Nevertheless, increasing quantities of corn are delivered directly from farms to corn and soybean processors.
2. The recent and expected shifts from wagons and single-axle trucks to semis is dramatic. By the year 2005, up to 60 percent of the corn and soybeans is likely to move from farms in semis. This shift to semis means that grain producers have increased transportation mobility and market power.
3. The rapidly rising share of corn and soybeans hauled from farms by semis means that there will be more grain traffic on county and state

highways leading to train-loading country elevators, grain processors and feeders.

4. Increased grain producer transportation mobility is likely to be a major factor determining the amount and location of grain transportation, and handling investment and disinvestments over the next decade.

## *II – Country elevator survey*

### **A – Summary of the results**

1. Country elevators shipped almost 44 percent of their corn and more than 80 percent of their soybeans to processors, down from 51 and 81 percent, respectively, in 1994-1995.
2. Almost 14 percent of the corn and 11 percent of the soybeans were shipped to Mississippi River terminals, down from 17 and 13 percent, respectively, in 1994-1995.
3. About 27 percent of the corn shipped from country elevators went to feeder markets, up from 21 percent in 1994-1995.
4. About 13 percent of the corn and 5 percent of the soybeans were shipped by rail direct to export ports and to Mexico, up sharply from 2 percent in 1994-1995.
5. Trucks dominated the shipments of corn from country elevators in the five eastern and southern CRDs. Railroads dominated the shipments of corn from the four CRDs in the Northwest quadrant of Iowa.
6. Trucks dominated the shipment of soybeans in all nine CRDs. However, there were large soybean shipments by rail from the Northwest and West Central CRDs.
7. Over one-fourth of the country elevators can segregate grain, and one-half expect to be able to segregate grain in 2005.
8. Only a small number – 3.9 percent – of elevators sell grain over the internet.
9. Country elevators expect to reduce their numbers of small feed delivery trucks and increase the number of semi feed delivery trucks by 54 percent by 2005.

## **B – Conclusions**

1. Country elevators are likely to continue to lose market share of total corn and soybean marketing.
2. Country elevators will continue to serve a major function of shipping corn and soybeans to distant markets.
3. Country elevators also have major opportunities in segregating and shipping identity preserved grains.
4. The data on county elevator feed truck ownership suggests a major restructuring of the feed industry in Iowa.
5. Given the likely decline in the country elevator share of grain shipments from farms and the likely restructuring of the feed industry, closing of old, obsolete grain elevators and feed mills would likely reduce the cost of marketing Iowa grain.

## ***III – Value added activities***

1. About 57 percent of the Iowa corn production and 59 percent of Iowa soybean production had value added to it in Iowa. Value added activities include fed on farms, processed in Iowa, or placed in a container for shipment.

# Appendices

	<b>Appendix</b>
<b>Grain Marketing Survey Questionnaire</b>	A
<b>Iowa Grain Handlers Marketing Survey Questionnaire</b>	B
<b>Population Estimation Methodology</b>	C

Appendix A.

## Iowa Grain Marketing Survey

1. Corn produced on this farm in 1999.....  bu.
  
2. How many bushels of corn were sold during the market year of September 1, 1999, through August 31, 2000?.....  bu.
  
3. How many bushels of corn produced by this farm were fed or consumed on your farm during the period of September 1, 1999, through August 31, 2000?.....  bu.
  
4. How many bushels of corn remain on this farm for future use as feed or for sale after Sept. 1, 2000?.....  bu.

	Bushels Hauled			
	Wagon	Single Axle Truck	Tandem Axle Truck	Semi
A) Country elevator.....				
B) Corn millers/processors				
1) In Iowa.....				
2) Out of Iowa.....				
C) River Terminals				
1) Illinois River.....				
2) Mississippi River.....				
3) Missouri River.....				
D) Another farm/feeding operation				
1) In Iowa.....				
2) Out of Iowa.....				
E) Picked up on farm, destination unknown.....				
F) Other (specify) _____				

8. How many bushels of soybeans produced by this farm were processed on your farm during the period of September 1, 1999, through August 31, 2000?.....

	bu.
--	-----

9. How many bushels of soybeans remain on this farm for future use or for sale after September 1, ..... 2000?

	bu.
--	-----

10. Of the 1999 soybeans sold, what was the destination from your farm and mode of transportation?

	<u>Bushels Hauled</u>			
	Wagon	Single Axle Truck	Tandem Axle Truck	Semi
A) Country elevator.....				
B) Soybean crusher				
1. In Iowa .....				
a) Of the soybeans sold to Iowa crushers, how much was for human consumption?.....				
b) ..... Of the soybeans sold to Iowa crushers, how much was for feed or non-human consumption?.....				
2. Out of state.....				
a) Of the soybeans sold to out-of-state crushers, how much was for human consumption?.....				
b) Of the soybeans sold to out-of-state crushers, how much was for feed or non-human consumption?.....				
C) River Terminals				
1) Illinois River .....				
2) Mississippi River .....				
3) Missouri River .....				
D) Picked up on farm, destination unknown.....				
E) Other (specify) _____				

11. What type and how many grain hauling vehicles do you currently own and expect to own by the year 2005?

Current Number	Year 2005

A) Gravity flow wagons.....



12. What is the average and maximum distance that you will move grain with the grain hauling equipment you have on your operation?

Wagon		Single Axle Truck		Tandem Axle Truck		Semi	
Average one-way miles	Longest one-way miles	Average one-way miles	Longest one-way miles	Average one-way miles	Longest one-way miles	Average one-way miles	Longest one-way miles

13. How many miles must you travel on unimproved, county, and state roads to deliver grain from your farm to your most frequently used market?

Corn	Unimproved Gravel Road Miles one way	Paved County Road Miles one way	State Highway Miles one way
Soybeans	Unimproved Gravel Road Miles one way	Paved County Road Miles one way	State Highway Miles one way

14. Were any of the corn or soybeans containerized by you before being shipped from your farm?

Yes....Continue.

No....Go to Question 16.

15. How many bushels of corn or soybeans were containerized by you before being shipped from your farm during the last twelve months?

Corn  bu.

Soybeans  bu.

16. Do you currently have means to segregate grains by specific traits?

Yes  No

Do you expect to have means to segregate grains by specific traits by 2005?

Yes  No

17. Did you use the Internet to market any of the grain you shipped from your farm during the period of September 1, 1999, through August 31, 2000?

Yes  No

If yes, what percent of your corn and soybeans were marketed on the Internet?

Corn  %

Soybeans  %

18. Would you like to receive a free copy of the results of this survey? ( ) YES = 1 .....

This completes the survey. Thank you for your help.

**Appendix B.**

## Iowa Grain Handlers Marketing Survey

1. Please classify your operation in one of the following categories (check one).

a. Country elevator	
b. Corn or soybean processor	
c. Barge terminal	
d. Terminal elevator	
e. Grain dealer with no licensed warehouse storage capacity	
f. Other (specify)	

2. What was the volume of grain movement to and from your facility for the 1999 market year of September 1, 1999, through August 30, 2000?

	Bushels Received		Bushels Shipped	
	Corn	Soybeans	Corn	Soybeans
Total 1999 Marketing Year				

3. What were your markets (where ownership changes), your modes of transport to each market, and the average distance hauled to each market? Report markets as a percentage of total marketings and transportation as a percentage of each market.

A. Corn Sales

Market	Percent of Sales	Percent shipped by				Average Distance by		
		Truck	Rail	Barge	Total	Truck	Rail	Barge
----- one-way miles -----								
1. Farmers as livestock feed								
a. In Iowa	%	%	%	%	100%			
b. Out of state	%	%	%	%	100%			
2. Millers/processors								
a. In Iowa	%	%	%	%	100%			
b. Out of state	%	%	%	%	100%			
3. River terminals								
a. Illinois River	%	%	%	%	100%			
b. Mississippi River	%	%	%	%	100%			
c. Missouri River	%	%	%	%	100%			

Market	Percent of Sales	Percent shipped by				Average Distance by		
		Truck	Rail	Barge	Total	Truck	Rail	Barge
----- one-way miles -----								
4. Direct to export market								
a. Gulf Coast	%	%	%		100%			
b. West Coast	%	%	%		100%			
c. Mexico	%	%	%		100%			
5. Other (specify) _____	%	%	%		100%			
<b>Total</b>	<b>100%</b>							

B. Soybean Sales

Market	Percent of Sales	Percent shipped by				Average Distance by		
		Truck	Rail	Barge	Total	Truck	Rail	Barge
----- one-way miles -----								
1. Processors								
a. In Iowa for human consumption	%	%	%	%	100%			
b. In Iowa for feed or non-human _____ consumption	%	%	%	%	100%			
c. Out of state for human consumption	%	%	%	%	100%			
d. Out of state for feed or non-human consumption	%	%	%	%	100%			
2. River Terminals								
a. Illinois River	%	%	%	%	100%			
b. Mississippi River	%	%	%	%	100%			
c. Missouri River	%	%	%	%	100%			
3. Direct to export market								
a. Gulf Coast	%	%	%		100%			
b. West Coast	%	%	%		100%			
c. Mexico	%	%	%		100%			

4. How many feed delivery trucks does your firm have in each of the following sizes?

	6 Ton	12 Ton	18 Ton	24 Ton
Number of feed delivery trucks at this time				
Number of feed delivery trucks you anticipate having 5 years from now				

5. What is the range in distance that you send the different sizes of feed delivery trucks?

6 Ton		12 Ton		18 Ton		24 Ton	
Average one-way miles	Longest one-way miles	Average one-way miles	Longest one-way miles	Average one-way miles	Longest one-way miles	Average one-way miles	Longest one-way miles

6. Does your elevator currently have a specialty grain program? ..... Yes  No

Does your elevator plan to have a specialty grain program in 2005? ..... Yes  No

7. How many bushels of corn or soybeans were containerized by your firm from September 1, 1999, through August 31, 2000?

Corn <input style="width: 100px; height: 25px;" type="text"/> bu.	Soybeans <input style="width: 100px; height: 25px;" type="text"/> bu.
---	---

8. How many bushels of corn and soybeans do you think you will ship containerized five years from now?

Corn <input style="width: 100px; height: 25px;" type="text"/> bu.	Soybeans <input style="width: 100px; height: 25px;" type="text"/> bu.
---	---

9. Did your firm use the Internet to market any of the grain you shipped from your facility during the period of September 1, 1999, through August 31, 2000?

Yes  No

If yes, what percent of the grain marketed in 1999-2000 was marketed on the Internet?

Corn <input style="width: 100px; height: 25px;" type="text"/> %	Soybeans <input style="width: 100px; height: 25px;" type="text"/> %
---	---

10. What is the maximum length and width of grain delivery equipment that your elevator can handle?

Maximum Length	Maximum Width
feet	feet

## Appendix C

# Population estimation methodology

Survey data were expanded to population estimates by the following methodology.

### Farm-to-market survey

The reported proportion of corn and soybeans marketed in the survey as a portion of total grain production was used to estimate total grain marketed using state grain production estimates at the Crop Reporting District (CRD) level. This procedure provided an estimate of total grain shipments by producers. Shipments by destination or vehicle type were estimated by multiplying the reported proportion of grain shipped to each destination and/or vehicle type in the survey by total estimated corn shipments.

For example, let  $C_{Mark}$  and  $C_{Prod}$  denote respectively total corn marketed and corn production as reported

in the survey. The variable  $\alpha_{Mark} \equiv C_{Mark}/C_{Prod}$  is defined as the proportion of corn marketed as reported by producers. Hence, total estimated shipments from producers to country elevators are:

$C_{elev,state} = \alpha_{Elev} \cdot \alpha_{Mark} \cdot C_{prod,state}$ ; where  $\alpha_{Elev}$  represents the proportion of corn shipped to elevators as reported in the survey and  $C_{prod,state}$  represents total corn production as estimated by Iowa Agricultural Statistics.

### Country elevators survey

Survey data yield an estimate of the proportion of elevators' shipments (of corn and soybeans) with respect to total elevator receipts by CRD. The population estimate of total corn and soybean shipments to elevators computed in the farm-to-market portion of the survey was used to compute a population estimate of elevators grain shipments by destination and vehicle.

For example, using the variable  $C_{elev,state}$  computed in the farm-to-market survey portion of our report, we can estimate elevators shipments from the  $E_{state} = \beta_{ship} \cdot C_{elev,state}$ ; relationship where the variable  $\beta_{ship}$  represents the percentage of shipments in the 1999-00 crop year with respect to elevators' receipts as reported in the survey. Once total elevators' shipments were estimated at the CRD level, the percentages of shipments to each destination and/or by vehicle type were used to compute population estimates of these shipments.

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