# The 2006/07 Iowa Grain and Biofuel Flow Study: A Survey Report

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Supporting Organizations:

- Agribusiness Association of Iowa
- Iowa Biodiesel Board
- Iowa Corn Promotion Board
- Iowa Farm Bureau Federation
- Iowa Institute for Cooperatives
- Iowa Renewable Fuels Association
- Iowa Soybean Association
- Iowa Department of Economic Development
- Iowa Department of Transportation

Project Partners:

- Iowa Department of Agriculture and Land Stewardship
- Iowa Office of USDA-NASS

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# The 2006/07 Iowa Grain and Biofuel Flow Study: A Survey Report

## Introduction

The rapidly expanding biofuel industry has changed the fundamentals of U.S. agricultural commodity markets. Increasing ethanol and biodiesel production has generated a fast-growing demand for corn and soybean products, which competes with the well-established domestic livestock industry and foreign buyers. Meanwhile, the co-products of biofuel production are replacing or displacing coarse grains and oilseed meal in feed rations for livestock. The emerging developments in agricultural and energy markets are changing the distribution of domestic grains and feeds, and the utilization of shipping modes.

As the leading producer of corn, soybeans, and ethanol, and as a dominant biodiesel supplier, Iowa has a strong and urgent need to update its transportation system services and information. It is essential that we understand the evolving flow patterns of field crops, feed, and biofuels to ensure that our state transportation system resources are well maintained for marketing these commodities. Therefore, in October 2007, Iowa State University, the Iowa Department of Agriculture and Land Stewardship, and the Iowa field office of the National Agricultural Statistics Service began a five-section survey on grain, biofuels, and biofuel co-product flows in Iowa during the 2006/07 marketing year. The first section of the survey dealt with the movement of grain from the farm to the market. The second section dealt with grain flows via grain handlers, such as elevators. The third, fourth, and fifth sections examined grain and related product movements for Iowa's corn and soybean processors, ethanol plants, and biodiesel operations. The questionnaires build on previous surveys that examined Iowa grain flows (Baumel et al., 1996, 2001). In order to get a better understanding of the shifting flow patterns, a consecutive survey will be conducted in the fall of 2008. The survey can help policymakers and industries analyze the impact the fast-growing biofuel industry is having on those grain flows and achieve the goal of maintaining an updated transportation system for stakeholders.

To ensure an adequate response, the 2007 survey process took several months. First, the survey was mailed to selected individuals/entities. Two follow-up mailings were sent to non-respondents several weeks later. Telephone follow-ups were conducted to fill out incomplete responses and clarify some extraordinary survey responses. Table 1 provides an overview of survey participation. Nearly 5,000 surveys were sent to randomly selected farmers and grain handlers. A comprehensive census was conducted for grain processors and biofuel facilities because of their small number. Within each of the five survey sections, the response rate exceeded 30 percent.

This report is divided into two sections. The first part reports the statewide results for each of five surveyed groups listed in Table 1. The state-level results provide a general idea of the grain and biofuel flows that occurred and the transportation that was utilized in the biofuel-boom era. In order to gain further insights into the regional level data, we present the survey results of grain marketers and handlers in each crop reporting district (CRD) in the second part of the report. The regional data can highlight the spatial characteristics of the survey results and distinguish the transportation needs between regions. Because of the small population of grain processors and

biofuel plants and to assure confidentiality, the CRD level results from processors and biodiesel survey are not shown.

# Part I: Statewide Survey Data of Iowa Grain Marketers, Handlers, Processors and Biofuel Plants

## Statewide Grain Marketers Survey Results

The grain marketers section of the survey asked farmers about their land allocation between corn and soybeans, their production during the year, their marketing/disposal of the crop, and their use of various modes of transportation. Producers were also asked to assess the transportation system in Iowa and provide their opinion of possible hindrances to efficient grain marketing. The following provides a brief summary of the survey results for this section.

### *Corn flows*

During the 2006/07 marketing year, Iowa corn producers planted 12.6 million acres, producing 2.05 billion bushels of corn. The survey results indicate that 82 percent of that corn was sold during the marketing year, 11 percent was utilized on the farm, and 7 percent had not been sold yet but was expected to be marketed in the near future. Figure 1 shows the market of Iowa corn production. The largest percentage of Iowa corn, 48 percent, was sold to cooperative elevators, followed by Iowa ethanol plants at 16 percent. About 14 percent went to private elevators and another 10 percent was marketed to processors. Nearly 7 percent went directly to river terminals and only 1 percent went to other farm/feeding operations. In general, 62 percent of Iowa's marketed corn went to elevators and 27 percent to ethanol plants and other corn processors.

In comparison, the 2001 survey (for the 1999/2000 marketing year) showed that 77 percent of Iowa corn was sold by farms during the marketing year, 15 percent was used on farm, and 8 percent remained to be sold. In that year, over 66 percent of Iowa corn went to elevators, while 13 percent was sent to corn processors, including ethanol plants. About 14 percent entered river terminals and 5 percent went to other farm/feeding operations. This shows that ethanol plants and other corn processors have gained market share of corn sold by Iowa producers while all other categories have lost ground. The shares of river terminals and other farm/feeding operations had the most reductions.

To move corn around the state, producers used a variety of vehicles, from small wagons to semis. Figure 2 shows the mode of transportation used to transport corn from the farm to the market. Roughly 70 percent of Iowa's marketed corn left the farm by semis. Wagons hauled 22 percent and other trucks carted off roughly 8 percent. Semi transport dominated shipping to almost all markets, except for delivery to grain elevators.

In the 2001 survey, roughly 48 percent of Iowa corn was shipped in semis, 26 percent by wagon, and 26 percent by truck. Over the past six years, farmers have shifted away from wagons and trucks toward semis. This tendency is primarily driven by the hauling efficiency, as a semi has much larger bushel capacity compared to a wagon, single-axle, or tandem-axle truck. Also, a semi can help producers reach more distant markets economically.

### *Soybean flows*

During the 2006/07 marketing year, Iowa crop producers planted 10.15 million acres to soybeans, producing 510 million bushels. A majority of those soybeans (92 percent) were sold during the marketing year. Only 1 percent was utilized on the farm and 7 percent was expected to be marketed in the near future. Figure 3 shows where Iowa soybeans were sold. As with corn, the largest percentage went to cooperative elevators (52 percent), while 18 percent was sold to Iowa soybean processors. Another 12 percent went to private elevators. The remaining 8 percent went directly to river terminals. In total, 64 percent of Iowa's marketed soybeans went to elevators, 19 percent to processors, 8 percent to river terminals, and 9 percent went to unknown destinations.

The previous survey (for the 1999/2000 marketing year) showed that 94 percent of Iowa soybean production was sold during the marketing year, 1 percent was used on farm, and 5 percent remained to be sold. In that year, 74 percent of Iowa's marketed soybeans went to elevators whereas 8 percent went to soybean crushers. Almost 10 percent went to river terminals and 8 percent went to unknown destinations. Over the six years since the previous survey, the share of soybean crushers increased, while deliveries to elevators and river terminals declined.

Figure 4 presents the mode of transportation used to transport soybeans from the farm to the market. As with corn, nearly two-thirds of Iowa soybean production was shipped by semi. Wagons hauled 24 percent and other trucks carted off roughly 10 percent. Semi transport again dominated shipping to almost all markets, except for delivery to grain elevators. In the 2001 survey, roughly 45 percent of Iowa soybean production was shipped in semis, 31 percent by wagon, and 24 percent by truck. Similarly, the semi share gained because of the greater hauling and distance capacity.

### *Transportation fleet*

As Figures 2 and 4 show, semis have become the preferred mode of grain transportation. Table 2 summarizes the current grain hauling vehicles operated by grain producers and what vehicles they planned to use in 2012. Gravity flow wagons still made up the largest number of grain hauling vehicles, with over 130,000 still on the farm. Over 16,000 trucks were also used to move grain. Grain producers in Iowa also owned nearly 17,000 semis and roughly 1,500 other grain hauling vehicles. However, over the next five years, farmers planned to reduce the numbers of smaller gravity flow wagons (less than 500 bushels) and trucks and replace that hauling capacity with the larger wagons (500+ bushels) and semis. By 2012, Iowa grain producers planned to own over 40,000 larger wagons and 21,000 semis, respectively. If realized, this represents an increase of 6 percent for current larger wagons and one-quarter more semis.

The number of wagons was down dramatically from the count in the previous survey. In 2000, there were over 230,000 wagons owned by Iowa farmers. Truck numbers were also down, from 33,400 in 2000. The number of semis increased from 12,300 in 2000. Producers projected the vehicle fleets in 2005 to consist of 173,600 wagons, 25,500 trucks, and 16,100 semis. The current survey's results indicate farmers reduced their numbers of wagons and trucks more quickly than they had anticipated but had increased the number of semis as expected. Several factors are likely leading to the shift to semis, including the possible time savings in hauling more grain in fewer loads and fewer delays in unloading combines.

Table 3 contains the average and maximum distances farmers move grain. As expected, wagons were primarily used for shipping crops to the closest market, while semis were used to deliver grains to much more distant markets. Wagon loads were often taken 4-5 miles, with a maximum trip of approximately 8 miles. Truck loads were usually taken 7-11 miles and did not normally exceed 20 miles. Semi loads traveled roughly 25 miles and were hauled nearly 50 miles on occasion. The distances reported for 2006/07 were roughly the same as those reported in the 1999/2000 marketing year.

Table 4 summarizes the average hauling distances from farms to reach their most frequently used market by type of road. The shortest distance for hauling was on unimproved gravel roads, roughly 5.5 miles in 2006/07. Paved county roads constituted 8 miles of hauling, whereas the average haul for state highways was 22.5 miles. Compared to the 1999/2000 survey results, the average distances grain was hauled from farms on those three types of roads all increased, suggesting that producers are now traveling further to reach their target markets. The increases in travel distances are likely relevant to the expanding biofuel industry, as grain producers have an alternative market choice. In addition, results in Tables 2 and 4 suggest that increasing gross vehicle weights on all rural roads and highways are expected, implying a higher demand for road maintenance.

***Other topics***

In both the current survey and the 2001 version, farmers were asked about containerizing their grain and oilseed production for shipping. In 1999/2000, less than 2 percent of farmers indicated they were containerizing. The current survey shows that roughly 4 percent of the producers who responded containerized some of their crop. Based on the survey results, over 60 million bushels of corn and 18 million bushels of soybeans were containerized on the farm for the 2006 marketing year. For both corn and soybeans, the quantities of the crops being containerized on the farm more than doubled from the 1999 marketing year.

Farmers indicated that they had over 1.8 billion bushels of on-farm storage capacity for the 2006 marketing year. They expected to increase storage capacity up to 2.3 billion bushels through 2012. Farmers were also asked about the ability to segregate grains by specific traits. In 1999/2000, nearly 32 percent of farmers said they were able to segregate, while in the 2006 marketing year that number had increased to 48 percent. Interestingly, that percentage was expected to remain stagnant over the next five years.

In the survey, we added a series of questions evaluating freight infrastructure in the state and possible barriers preventing efficient grain marketing. For the infrastructure rating, producers were given a 5-point scale with 1 being poor, 3 being average, and 5 being excellent. For the possible hindrances, a 5-point scale was also used, with 1 representing “not at all,” 3 being “somewhat,” and 5 being “definitely.” For both parts, producers could also indicate if the infrastructure and/or hindrance were not applicable (N/A) to their business. Tables 5 and 6 summarize the results for the infrastructure rating, and Tables 7 and 8 present the results for the possible hindrance rating.

Overall, producers rated Iowa's infrastructure as average. Only the interstate system rated above average. Rail lines received the largest percentage of poor ratings, but unimproved gravel roads had the largest combination of poor and below-average ratings. For the hindrances, in almost all cases the largest percentage of producers indicated no significant issues, with exceptions being in the amounts of on-farm storage and transportation costs. Over 10 percent of producers indicated definite issues with road and bridge weight restrictions, elevator unloading times, transportation costs, rail access, and rail reliability.

## Statewide Grain Handlers Survey Results

The grain handlers survey data were collected by questionnaire from a list of 1,003 grain elevator firms in Iowa. A majority of surveyed grain handlers are country elevators (84 percent), while grain dealers without licensed warehouse and storage capacity account for 8 percent. Barge terminals and terminal elevators comprise a small share of this group.

### *Corn flows*

During the 2006/07 marketing year, about 1.1 billion bushels of corn were received by grain handlers and 99 percent of those bushels went to the market. Figure 5 presents the destination of the corn processed by the country elevators. The largest percentage, 26 percent, went to Iowa's dedicated ethanol plants, followed by Iowa feeders (23 percent) and processors (18 percent). Out-of-state feeders purchased 11 percent of the corn. River elevators (Mississippi, Illinois, and Missouri) together received less than 5 percent of handlers' corn. More than 11 percent went directly to export markets (Gulf Coast, West Coast, Mexico, and others). In total, nearly 34 percent of Iowa handlers' corn went to feeders, 26 percent to ethanol plants, 20 percent to corn processors, 11 percent directly to export markets, and 4 percent to river terminals.

In comparison, the 2001 survey (for the 1999/2000 marketing year) showed that 44 percent of Iowa handlers' corn went to corn processors, including ethanol plants, which is similar to the share that went to corn processors in 2006/07. The livestock industry utilized almost 27 percent of country elevators' corn six years ago and absorbed one-third of the corn in the current survey. The dramatic change in the utilization of handlers' corn between 1999/2000 and 2006/07 is the share of corn entering the river terminal; it declined from 15 to 4 percent over the past six years. This shift from the export-destined market to domestic customers is likely driven by the strong demand for corn from the local livestock and ethanol industries. Although the share of corn utilization in some markets may decline, the corn volume to those markets is expected to increase, as total corn marketed posted significant growth between the two survey periods.

Handlers move corn around the state by trucks or by rail. Trucks are primarily used for in-state transportation whereas out-of-state shipments mainly depend on rail. The current survey results indicate that almost 66 percent of corn was transported from country elevators by trucks, while rail transportation accounted for only 30 percent of corn movements by grain handlers. In 1999/2000, roughly 43 percent of Iowa corn was shipped by trucks. Over the past six years, country elevators shifted away from rail to trucks as local demand for corn increased. The average truck haul distances from Iowa handlers to in-state feeders, ethanol plants, and millers/processor was 23, 36 and 54 miles, respectively. The respective average travel distances

of corn rail shipments from country elevators to out-of-state feeders and to processors were 1,050 and 633 miles. The average distances of corn hauled by rail from Iowa grain elevators to the Texas Gulf and to Mexico were about 956 miles and 1,032 miles, respectively.

### *Soybean flows*

Figure 6 summarizes the destination markets of Iowa soybeans handled by country elevators. A majority of soybeans were sold to in-state processors (64 percent) while 8 percent of soybeans went to out-of-state processors. Nearly 12 percent of soybeans entered the river terminals, while more than 13 percent was transported to export market directly. In total, 72 percent of Iowa's soybeans went to processors, 12 percent to river terminals, 13 percent to the coasts or borders, and 1 percent to other markets.

The 2001 survey showed that nearly 80 percent of Iowa soybeans went to soybean crushers, 12 percent went to river terminals, and about 8 percent went to the coasts and Mexico. The percentage of soybeans sent to crushers declined, while direct deliveries to the export markets increased. This may be driven by the stronger demand for soybeans from China, also by the lower soybean meal demand because of alternative protein source available from DDG.

Survey results indicate that almost 80 percent of soybeans sold by country elevators was delivered by trucks. Rail lines handled only 8 percent of soybean shipments from country elevators in the 2006 marketing year. Trucks were primarily utilized for transporting soybeans to crushers (both in state and out of state) and river terminals, while rail was dominant for more distant market, such as coasts and borders. The average truck hauling distances from grain handlers to Iowa and out-of-state crushers were about 48 miles and 80 miles, respectively. Only a small share of soybeans was shipped by rail to crushers in Iowa and to other states, with respective average distances of 197 and 976 miles.

The changes in the shares of transportation modes utilized by handlers for soybeans between 2006/07 and 1999/2000 are somewhat interesting. In the 1999 marketing year, almost 82 percent was transported by trucks, while rail transportation only accounts for 18 percent of soybean movements. The current survey shows trucks were still the major transportation mode, accounting for 78 percent of soybean shipments. However, barges became the second most utilized mode for soybeans (13 percent) and the share moved by rail dropped by almost 8 percent. The quick growth in barge utilization was primarily driven by the expansion of export markets for soybeans.

### *Other topics*

In addition to corn and soybeans, the 2006/07 survey also asked for country elevators' experience in handling ethanol co-products. The results suggest that Iowa's country elevators handled a total of 2.15 million tons of ethanol co-products. The average distance between country elevators and the ethanol plants was about 45 miles. For the containerized grain shipments, the survey showed that more than 1 percent of Iowa corn and soybeans was transported in containers to destination markets. In 1999/2000, a very modest portion of corn (0.1 percent) and soybeans (0.8 percent) was containerized by the country elevators. Although

the current share of containerized grains of overall grain transactions was still modest, this growth rate is significant, particularly for corn.

For those country elevators that have access to rail service, the typical size of their corn and soybean rail shipments was also examined. Table 9 shows, on average, that most of Iowa's country elevators shipped 25 to 49 rail cars per shipment for both crops. About a quarter of corn handlers chose unit train (100+) rail cars, while the other quarter of handlers shipped a relatively small amount per shipment (1-24 rail cars). Soybean rail shipments had a similar pattern.

Table 10 summarizes the percentage of feed trucks by size that Iowa grain handlers currently owned and the percentage they expected to own by 2012. The 24-ton semi accounted for 35 percent of total trucks owned by the handlers and its share was expected to increase to 44 percent by 2012. The share of 6-ton trucks was expected to decline from 22 percent to 15 percent over the next six years because of the limited capacity and travel range. Again, the advantage of larger capacity and lower unloading time boosted the demand for the larger-size truck. The average and maximum distances feed trucks traveled to market is included in Table 11. As expected, travel distance increased with larger truck size. Semis traveled significantly longer average distance (34 miles) compared to small-size trucks, as the 24-ton semis make the deliveries more economical.

Tables 12 and 13 summarize grain handlers' ratings of the freight infrastructure in Iowa. In general, country elevators rated Iowa's infrastructure as average. They were particularly satisfied with the interstate system. Unimproved gravel roads received the most negative evaluations. Excluding the elevators who did not respond or marked "not applicable" in their evaluations of the specific transportation modes, almost 26 percent of handlers evaluated paved county roads below average, while rail lines were rated below average by one-quarter of rail service users.

Tables 14 and 15 present the likely logistical hindrances for handlers in marketing their grains. Obviously, the trucking costs were the biggest concern for country elevators in efficiently marketing their grains, while the seasonal labor availability and elevator storage capacity also created significant challenges for grain marketing. For country elevators with access to rail lines, rail costs also adversely affected their grain marketing. In addition, over 10 percent of country elevators identified definite issues with road and bridge weight restrictions, elevator unloading times, rail access, rail reliability, and rail costs. Interestingly, most grain handlers with access to barge service did not view barge service as a hindrance to grain marketing.

## Statewide Corn Processors Survey Results

During the 2006/07 marketing year, the majority of Iowa corn processors (85 percent) utilized dry-mill processes and produced ethanol and its co-products. Estimated total nameplate ethanol production capacity based on the survey was 2.2 billion gallons per year. About 38 percent of survey respondents indicated that their facilities plan to expand their operations by 2012, 23 percent did not plan to expand, and 38 percent said they were undecided. The survey results implied that for the 2006 marketing year (September 1, 2006 to August 31, 2007), Iowa corn processors produced roughly 2 billion gallons of ethanol, 5.1 million tons of dried distillers grains (DDG), and 2.6 million tons of wet distillers grains (WDG). For those processors that

produced ethanol, ethanol sales accounted for 85 percent of their total dollar sales, while sales of WDG and DDG each contributed almost 8 percent of total sales.

Iowa corn processors purchased 92 percent of their corn needs from Iowa sources and moved all by truck. The average distance the corn was shipped by truck was 32 miles. Survey results indicate that most of ethanol and DDG sales were delivered to out-of-state destinations whereas WDG was primarily utilized in Iowa. Figure 7 presents where ethanol, DDG, and WDG were sold. For ethanol sales, other states were the dominant markets for Iowa ethanol production while 7 percent of ethanol was used in state. The international market for Iowa ethanol was still pretty thin (<2 percent). Similarly, a significant portion of Iowa-produced DDG was sold to other states while the local livestock industry absorbed almost 30 percent of DDG production. International markets took more than 10 percent of Iowa DDG production. In contrast, WDG was basically utilized in local feed lots, as the moisture content of WDG makes it hard to store and transport.

Practically all of the ethanol sales to Iowa buyers were shipped by truck, with an average haul of 98 miles. Nearly 60 percent of ethanol sales to out-of-state destinations was transported by rail; trucks accounted for another 40 percent of interstate ethanol sales. The average rail haul of Iowa ethanol sales to other states was 955 miles. Similar transportation mode utilization was observed for DDG sales. Truck shipments constituted nearly all of in-state sales, while the rail industry handled over 60 percent of DDG sales to other states. All reported WDG sales were transported by truck.

The survey then further examined the destinations for ethanol and DDG sales. Figure 8 presents the share of ethanol sales in those regions identified in the survey. Based on valid responses, about 23 percent of ethanol was sold to California, Arizona, Nevada, and Utah, while about 10 percent of ethanol was shipped to the Northeast region. More than 7 percent of ethanol was destined to Southern Plains states, such as Texas, Oklahoma and New Mexico. A major share of ethanol production was shipped to states not listed in the survey, which likely suggests that Iowa ethanol is primarily used in the surrounding states. This question will be further examined in the Phase II of this study as more detailed destination regions will be added in the Phase II survey.

Similarly, detailed information about DDG sales destinations is summarized in Figure 9. For those states specified in the survey, California group states received a quarter of Iowa DDG production while Texas group states purchased about 13 percent of Iowa DDG. Since DDG is particularly suitable for ruminants, it is not a surprise to see that California and Texas group states absorbed nearly 40 percent of Iowa DDG sales, as California is a major dairy production state, while the Texas panhandle is a dominant beef cattle production region. The Northeast region received almost 10 percent of Iowa DDG sales. More than 50 percent of Iowa DDG sales that went to other states were not explicitly determined; it will be indentified in the Phase II study.

***Other topics***

In the survey, corn processors were asked if their facilities have a specialty grain program targeting specific traits in the corn they purchase. About 15 percent of the facilities indicated they have such a program. Thirty-one percent indicated they would have a specialty grain

program by 2012, 38 percent indicated they would not, and 31 percent were undecided. The processors were also asked questions regarding fractionation processes. The majority of processors (85 percent) did not use a fractionation process prior to fermentation in 2006/07. However, nearly 23 percent of processors expected to adopt this process by 2012, while about 46 percent of processors did not expect to adopt a fractionation process over the next five years. Regarding the question of corn oil extraction, only 8 percent of processors extracted corn oil in 2006/07; however, half of the processors said they would implement it by 2012 to earn the extra revenue derived from the corn oil. On the question of cellulosic ethanol capabilities, about 38 percent of processors were not considering adding cellulosic capabilities by 2012 while 62 percent of processors were undecided.

Evaluations of Iowa's corn processors of the state's freight infrastructure and possible barriers to more efficient marketing for their products are summarized in Tables 16 through 19. Overall, corn processors rated Iowa's infrastructure as average. The interstate system received the most satisfaction among the state's freight infrastructure systems. Paved county roads were also rated above average. None of the freight infrastructure systems received poor ratings, but rail lines had the largest percentage of below-average ratings. Regarding the potential logistic hindrances to marketing, rail service costs were the most significant issue for corn processors, followed by rail service reliability and rail access. Storage capacity at their facilities and trucking costs were also indentified as challenges for corn processors in marketing their products.

## Statewide Soybean Processors Survey Results

The Iowa soybean processors survey results show Iowa processors together had the capacity to crush approximately 303 million bushels of soybeans annually in 2006/07. Roughly 9 percent of the facilities surveyed planned to expand crushing capacity by 2012, 73 percent did not expect any expansion, and 18 percent were undecided. For the 2006 marketing year (Sept. 1, 2006 to Aug. 31, 2007), Iowa soybean processors purchased 284 million bushels of soybeans and sold 754 million pounds of industrial-use soybean oil, 2.5 billion pounds of food-use soybean oil, and 6.8 million tons of soybean meal. On average, about 37 percent of total dollar sales were from soybean meal, 29 percent from soybean oil, and 33 percent from other products.

Processors indicated that more than 95 percent of all soybeans processed were received from Iowa. Over 99 percent of the Iowa soybeans and 82 percent of the soybeans from other states used by Iowa processors were shipped by truck. The rest was shipped by rail. Average truck hauls were 48 miles for Iowa soybeans and 169 miles for soybeans from other states. Soybean meal sales were fairly dispersed. Nearly half of all soybean meal sales went to other states. About 42 percent of the soybean meal was sold within Iowa and over 8 percent was exported to other countries. The reported Iowa soybean meal sales were all shipped by truck, with an average haul of 69 miles. Less than 10 percent of soybean meal sales to other states was shipped by truck; other out-of-state meal sales were handled by rail carriers. The truck loads had an average distance of 362 miles, while the rail loads typically moved the products 1,242 miles. All of the reported international sales were shipped by rail.

For soybean oil sales, target markets were divided between industrial and food usage. Sales for industrial use were split between Iowa (36.5 percent) and other states (63.5 percent). Sales for

food use were almost exclusively to other states, with sales to Iowa buyers at only 0.5 percent of the total volume.

As with the corn processors, we grouped several states into regions and asked soybean processors to determine the share of their sales to those regions. Figure 10 summarizes the reported survey, indicating that about 42 percent of soybean meal was sold to Iowa buyers. The Southern Plains states of New Mexico, Oklahoma, and Texas purchased 11 percent. The Northeast purchased over 5 percent and the West Coast acquired roughly 6 percent. Less than 2 percent of Iowa's soybean meal was sent to the Southeast.

Iowa soybean processors' evaluations of the state's freight infrastructure and likely barriers to more efficient marketing for their products are presented in Tables 20 through 23. In general, soybean processors rated Iowa's infrastructure as average. The interstate system received the most satisfaction among the state's freight systems. More than 10 percent of soybean processors rated rail lines, paved county roads, and unimproved gravel roads as poor. The gravel roads received the lowest rating. As for the hindrances, rail concerns and trucking costs were the most significant issues for soybean processors.

## Statewide Biodiesel Producers Survey Results

The biodiesel survey questionnaire was sent to all biodiesel plants operating in Iowa at the time of the survey. Over 60 percent of the plants provided at least a partially completed survey. For the 2006/07 marketing year, the surveyed plants had a total nameplate production capacity of 256 million gallons per year. By 2012, those same plants planned to have a total nameplate capacity of 294 million gallons per year. Biodiesel production totaled 102 million gallons during the period between September 1, 2006, and August 31, 2007. This implies a roughly 40 percent capacity utilization rate for the Iowa biodiesel industry.

Along with the biodiesel, the surveyed plants reported production of 116,000 tons of glycerin. A majority of the biodiesel plants (70 percent) indicated they were not looking to add on-site soybean crushing capacity. For the 2006/07 marketing year, biodiesel represented nearly 94 percent of the total biodiesel-related sales in dollar terms. Glycerin made up just over 5 percent, with other co-products adding nearly 1 percent of sales.

While a variety of feedstocks were used to create biodiesel, soybean oil dominated the Iowa production scene. In the 2006/07 marketing year, the surveyed plants indicated that 733 million pounds of soybean oil were converted to biodiesel. Looking forward to 2012, these same plants expected to use nearly 1.5 billion pounds of soybean oil. Most of the soybean oil was purchased in state (70 percent) and all of the in-state soybean oil reportedly was shipped by truck. The average one-way shipment for in-state soybean oil was 114 miles. Of the out-of-state soybean oil, 68 percent was shipped by truck with the rest shipped by rail. The average one-way distances for soybean oil shipments were 126 miles by truck and 371 miles by rail.

Figure 11 shows the breakdown of reported Iowa biodiesel and glycerin sales. Nearly half of Iowa's biodiesel was sold in state, while international exports represented a small portion of the market, just over 7 percent. About 65 percent of Iowa's in-state biodiesel was shipped by truck,

with an average one-way distance of 67 miles. The rest was shipped by rail. Biodiesel shipments to other states were mostly by truck (56 percent) while rail captured the remainder. For the shipments to other states, the average truck haul was 268 miles and the average rail haul was 1,167 miles. The glycerin market is dominated by international sales: over 75 percent was shipped out of the country. Domestic glycerin shipments from Iowa were split into roughly two-thirds by truck and one-third by rail. The typical distances were 90 miles by truck and 357 miles by rail. All of the reported international glycerin shipments were by rail.

Figures 12 and 13 provide a closer look at the biodiesel and glycerin markets. In 2006/07, the Pacific Northwest (Washington, Oregon, and Idaho) accounted for more than 12 percent of Iowa biodiesel sales, while the Southern Plains states (Texas, Oklahoma, and New Mexico) purchased almost 9 percent of Iowa biodiesel sales. Other regions that are not specified in the survey (most likely other midwestern states) are also larger markets for Iowa biodiesel. As presented in Figure 11, most of Iowa glycerin sales went to in-state and international markets. Those selected regions in the survey received barely any glycerin from the Iowa biodiesel industry (Figure 13).

As in the other project surveys, we asked Iowa's biodiesel producers to rate the freight infrastructure in the state and possible barriers to more efficient marketing for their products. Tables 24 and 25 summarize the results of the infrastructure ratings, and Tables 26 and 27 present the ratings of possible hindrances. Interstates were still the most preferred infrastructure by biodiesel producers, while unimproved gravel roads received the most negative feedback. Also, high transportation costs were identified as the most significant obstacles for producers in marketing their biodiesel.

# Part II: Crop Reporting District Survey Data for Grain Marketers and Handlers

This section presents the details of survey data at the crop reporting district level for grain marketers and handlers. The number of farms and country elevators sampled and usable responses by Iowa's nine crop reporting districts are presented in Table 28. The purpose of this section is to illustrate the spatial characteristics of the survey data and compare the variations and similarities of grain flows, transportation mode utilization, and other responses to interesting questions among crop reporting districts (see Figure 14 for a map of the counties in each district).

## Crop Reporting District Survey Results for Grain Marketers

### *Corn flows*

Table 29 outlines the corn planted area and production by crop reporting district (CRD) as published by the USDA-NASS. The table also shows the disposition of the crops. The lowest percentage of corn sold off the farm is in Northeast Iowa, where roughly 75 percent was sold and over 20 percent was used on the farm, the highest percentage in the state. In Northwest, East Central, and Southwest Iowa, over 10 percent of the corn produced was used on farm. Just over 4 percent of the corn crop was still available at the end of the marketing year in Northeast and

South Central Iowa, while producers in North Central, Central, East Central, and Southwest Iowa had more than 8 percent of their corn crop still available at the end of the 2006 marketing year.

Figure 15 and Table 30 display the share of corn producers' markets by each district. Country elevators were the top destination market for corn sales in all CRDs. However, country elevators in the Northwest, North Central, West Central, and Southwest were the particularly dominant markets, accounting for more than 64 percent of corn sales in those regions. The extensive network of train-loading facilities was identified as the foremost advantage of those country elevators. For the East Central district, Mississippi River terminals were the top destination. Iowa ethanol plants absorbed at least 10 percent of all corn sold in every district, with the exception of East Central Iowa. The ethanol industry in the Central district absorbed more than one-quarter of corn sales in the district. A great number of corn processors and barge terminals are located in eastern Iowa; hence, corn processors and river terminals purchased at least 10 and 15 percent of all corn sold in those regions, respectively.

The makeup of Iowa's corn transportation off the farm varies from north to south in the state. Figure 16 and Table 31 show the share of various types of vehicles used to move corn by CRD. It is clear that semi usage dominated in each district, while wagons (particularly the large-size model) were used relatively more often in northern Iowa, up to one-third in the Northwest district. Tandem axle trucks were used more in the central parts of the state. In the East Central CRD and southern districts of Iowa, semis moved at least 80 percent of the corn crop. The utilization of truck by size was directly related to the destination markets of each crop district. As Figure 15 shows, corn processors and barge terminals on the Mississippi River were the major destinations of South Central and East Iowa; consequently, semis became the primarily vehicle for corn shipment in those districts. Similarly, the Southwest CRD targeted Omaha-Council Bluffs and Kansas City markets, so semis were most in use in that CRD. In Northwest, North Central and Central CRDs, wagons were commonly operated for corn shipments because of the extensive network of train-loading elevators in those regions. The hauling distance of wagons was relatively shorter than distances of other vehicles so corn producers preferred wagons for local shipment to those elevators.

### *Soybean flows*

The CRD acreage and production for soybeans are given in Table 32. Over 90 percent of the 2006 soybean crop in each district had been sold by August 31, 2007. On-farm usage exceeded 1 percent in Northwest, Northeast, West Central, and East Central Iowa. Producers in Northwest, East Central, and Southwest Iowa were holding a slightly larger percentage of their soybean crop in inventory than the rest of the state. South Central Iowa had the lowest percentage of remaining soybean production, at 3 percent.

Figure 17 and Table 33 illustrate the markets for Iowa soybeans by district. Similar to corn, elevators were often the largest market for soybeans. However, the share of the markets still varied between geographic locations. Country elevators purchased more at least 69 percent of soybeans sold in the Northwest quadrant of Iowa, while their share dropped to about 30 percent in the East Central district. In East Central and Southeast Iowa, Mississippi River terminals captured nearly 30 percent of the soybeans sold. In Southwest Iowa, in-state soybean crushers

bought 30 percent of the soybeans sold. In fact, Iowa soybean crushers purchased at least 10 percent of the soybeans sold in every district in Iowa. In Southeast Iowa, out-of-state soybean crushers bought over 8 percent of the soybeans sold. A sizable percentage (3-12 percent) of soybeans was sold to entities not listed in the survey in each district.

As with corn, the share of soybeans delivered from farms by type of vehicle in each CRD changes from northern to southern Iowa. Figure 18 and Table 34 present the share of soybean shipments by various types of vehicles in each CRD. Wagons played a greater role in the Northwest quadrant of Iowa, as country elevators are concentrated in this area, while trucks were used more in the central part of the state. Semis moved less than 50 percent of the soybeans in the Northwest, whereas in all three southern Iowa CRDs semis were used to ship over 80 percent of the soybeans sold.

Table 35 displays the average distances traveled on various types of roads to get the crops to market. In most districts, state highways represented the longest stretches of those hauls. Unimproved gravel roads made up a larger part of the trip in the central part of Iowa. Typically, shipping patterns were similar across corn and soybeans, but there were some exceptions. In North Central and Central Iowa, corn shipments tended to travel more on gravel roads and paved county roads than did soybean shipments. This pattern could be a result of the shift toward marketing corn directly to ethanol plants. The average and maximum shipping distances from farms to markets by vehicle type in each CRD are summarized in Tables 36 and 37. As expected, semis were used for longer hauls, while wagons covered the shorter trips (less than 5 miles). Also, the travel distances of semis in the three East and Southwest CRDs were certainly longer than distances in other districts. This again shows the difference target markets among districts: corn processors and river terminals for the East zone, Omaha-Council Bluffs and Kansas City for the Southwest, and country elevators for the Northwest quadrant of the state.

### *Transportation fleet*

Table 38 outlines the current fleet of grain hauling vehicles and projections for 2012. Wagons made up most of the current fleet, but their numbers have been declining for some time. The 2012 projections show the overall vehicle number falling, as multiple wagons are expected to be replaced by semis. Overall vehicle numbers are projected to be down in all districts, ranging from 18 percent in North Central Iowa to 48 percent in the Southwest district. The number of small wagons is projected to fall by 30 to almost 80 percent. These wagons are being replaced by semis in most areas of the state: larger wagons in Northwest, North Central, Northeast, and East Central Iowa, and tandem axle trucks in Northeast and East Central Iowa. The largest shift to semis is projected in West Central Iowa, where the number of semis is projected to increase by 74 percent. Figure 19 shows how the overall numbers of grain hauling vehicles have changed over the past six years and how they are projected to continue to change. The projections for 2005 are taken from the 2001 Iowa grain flow survey.

### *Other topics*

The district breakdown for containerized shipments is given in Table 39. The results showed that farmers in the central part of the state were less likely to containerize than were farmers to the

east or west. Over 10 million bushels of corn were containerized in Northwest and Northeast Iowa. For soybeans, the East Central region was the area with the greatest use of containers, at 8.2 million bushels.

Tables 40 through 45 contain the district ratings of Iowa's freight infrastructure. The percentages are based on the number of responses to the question, which varied by district and by question. Rail lines received relatively lower ratings in the Northeast, South Central, and Southeast districts. For each of those districts, over 20 percent of respondents rated the rail lines as poor. The rail lines received the highest ratings in West Central Iowa. The interstates were generally rated average to good, with the lowest ratings in Southwest and South Central Iowa. The primary state highways received their highest ratings in Northwest Iowa with 11 percent of respondents indicating the highways were in excellent condition. More below-average ratings for the state highways were seen from producers in Northeast, West Central, Central, and Southwest Iowa.

The paved county roads were rated slightly higher in Northwest Iowa and slightly lower in Northeast Iowa. South Central Iowa also had more producers who considered the county roads below average. As one might expect, the unimproved gravel roads received the lowest ratings of the roadways. In South Central Iowa, 24 percent of respondents indicated the district's gravel roads were in poor shape, while no producers indicated the roads were excellent. Iowa's waterways were generally rated average. However, nearly one-fifth of respondents in Southwest Iowa considered the waterway they accessed to be in poor condition, while more than 43 percent of farms in the South Central district rated accessed waterway conditions below average.

Tables 46 through 57 show the ratings of marketing hindrances by CRD. Based on the responses, rail service costs were the biggest marketing hindrance in Northwest, West Central, Central, and Southwest Iowa. Trucking costs were the biggest marketing hindrance in North Central Iowa. Rail service access was the biggest marketing hindrance in Northeast and Southeast Iowa. Elevator unloading times were the biggest marketing hindrance in East Central and South Central Iowa. Over 10 percent of respondents said road and bridge weight restrictions definitely hindered marketing.

Elevator unloading time concerns were mainly in East Central, Southwest, and South Central Iowa. The distance to preferred markets was a significant issue in the South Central district as well. Trucking costs and rail service concerns (access, reliability, and costs) were high on the list of obstacles to efficient grain marketing. In many cases, 15 percent of respondents indicated these issues were a definite hindrance.

## Crop Reporting District Survey Results for Grain Handlers

### *Corn flows*

Figure 20 and Table 58 summarize the share of the corn market for elevators in each CRD. Feedlots were the major destination markets for country elevators in the western CRDs and obviously dominated corn sales in the South Central district, absorbing almost 80 percent of corn sold in this district. At least 10 percent of corn was sold to the ethanol industry in all CRDs,

except for the South Central district. Ethanol plants are particularly strong buyers in Northwest, North Central, Central, and East Central districts, accounting for at least one-quarter of corn sales in each district. At least 37 percent of corn sold by country elevators in the three East districts went to wet milling processors. Mississippi River terminals, as expected, purchased a significant share of corn sales in those eastern districts. A sizeable amount of corn (8-12 percent) was sold to Mexico by country elevators in Northwest, North Central, Central, and South Central districts, facilitated by the convenient rail network located in these regions.

Figure 21 presents the share of corn delivered from country elevators by shipping mode in each CRD. In general, trucks were mostly used for corn shipment; however, rail dominated corn deliveries from Southwest and South Central districts because of distant target markets. Compared to the 2001 survey results, trucks gained a large market share in most districts. This shift of mode suggests that demand from local markets has been increasing and that the ethanol industry has played an important role in this transition. In the eastern districts, barges were an important mode for corn movement. Detailed numeric data for Figure 21 can be found in Table 59.

### *Soybean flows*

The shares of the soybean destination market taken by country elevators by CRD are presented in Figure 22 and Table 60. Except for the Southeast and East Central, in-state crushers purchased the most soybeans sold by country elevators, at least 65 percent of all sales. In the Southeast district, Mississippi River terminals received more than 56 percent of soybeans sold in this region. Almost half of soybean sales by country elevators in the East Central district went directly to the Gulf Coast. Mexico buyers received between 5 and 10 percent of soybean sales marketed from country elevators in the western and South Central districts.

Since in-state crushers are the major markets for most of the CRDs, trucks became the foremost shipping method. Figure 23 illustrates the obvious contrast between trucks and other transportation modes. Rail carriers carried almost 30 percent of soybean shipments in the Southwest district because of remote out-of-state markets. Barges were certainly the dominant means for shipping soybeans from East Central and Southeast country elevators, accounting for nearly half of their soybean sales. Table 61 summarizes detailed statistics on the share of each mode.

### *Other topics*

The volume of ethanol co-products (such as dried or wet distillers grains, corn gluten feed or meal, brewers grains, and condensed distillers solubles) handled, brokered, mixed or processed by CRD country elevators is presented in Table 62. Country elevators in the Northwest district received almost 900 thousand tons of co-products from September 1, 2006, through August 31, 2007, the most volume handled among all CRDs. The second-largest volume of co-products was handled by North Central district elevators, more than 370,000 tons of co-products. The Southeast district received the least ethanol co-products. Because of limited responses from Southwest and South Central districts, their statistics are not released here to maintain

confidentiality. The average one-way distance ranges between 30 to 70 miles, suggesting most of the co-products were obtained from regional ethanol plants.

Table 63 summarizes the total number of feed trucks operated by country elevators by size and CRD. In 2000, more than 60 percent of semi trucks operated by country elevators were located in the Northwest, North Central, and East Central districts. Smaller-size trucks were expected to decrease in most of the CRDs over the next five years, while a significant growth in the use of semis was expected in the Northwest and in the three southern districts.

Table 64 shows the average and maximum one-way distances feed trucks traveled by size and CRD. Clearly, semi trucks were primarily used for more distant markets, while country elevators utilized smaller trucks (e.g., 6-ton trucks) for close markets. Combining the results shown in Table 63, the survey shows a trend toward increasing numbers of heavier trucks traveling longer distances, as semi trucks are most economical for long-distance hauls. This implies that road condition and maintenance will be even more critical in the future.

Tables 65 through 70 summarize the CRD country elevator ratings of Iowa's freight infrastructure. The percentages are based on the number of responses to the question, which varied by district and by question. Most of the country elevators rated the rail lines average, except for those in the Southeast district. More than two-thirds of elevators in the Southeast region evaluated rail lines as below average, while almost 30 percent of country elevators in North Central, Northeast, and South Central districts came to the same conclusion. The interstates were generally rated average to good. The primary state highways received their highest ratings in the West Central district, with more than 20 percent of respondents indicating the highways were in excellent condition. Almost 30 percent of respondents in the Northeast and West Central CRDs rated the state highways below average.

The paved county roads received below-average ratings from 44 percent of respondents in Northeast Iowa, whereas 46 percent of country elevators in the South Central district considered their county roads above average. The unimproved gravel roads received the lowest ratings of the roadways. More than half of respondents in Northeast and South Central districts indicated the districts' gravel roads were below average. Iowa's waterways were generally rated average, while 14 percent of respondents in the Southwest district considered the waterway they use to be in poor condition.

Tables 71 through 82 show the country elevators' ratings of marketing hindrances by CRD. Road weight restrictions were considered a big hindrance in the Northeast, Southwest, and South Central districts. Seasonal labor availability was a significant concern for grain marketing by country elevators in most regions except for the three southern districts. This is an issue particularly in West Central Iowa; nearly half of those respondents considered being short of seasonal labor a definite hindrance to marketing their grain. Storage capacity on site was also a challenge for country elevators in marketing their grain in the 2006 marketing year. More than 20 percent of respondents in seven districts, all but North Central and West Central, considered storage capacity a definite hurdle for their grain marketing.

Trucking costs were a common issue for country elevators in all CRDs, while rail costs also created considerable pressure on grain elevators, except in the Southeast district. Rail service access was the significant hindrance for respondents in South Central and Northeast Iowa, while rail service reliability was the biggest challenge for grain elevators in Southwest, North Central, and Northeast districts. Barge service and costs were considered definite issues for country elevators in South Central Iowa.

## Conclusions

This study reports updated information about grain flows from Iowa farms and country elevators to destination markets and associated transportation mode utilization between September 1, 2006, and August 31, 2007. Attention is also given to feedstock resources and product markets for the Iowa biofuel industry. In addition, evaluations of transportation infrastructures are included, and likely hindrances to efficient marketing of commodities by those shippers are identified.

Country elevators are still the primary market for Iowa grain producers, accounting for 62 percent of corn and 64 percent of soybeans sold by farms statewide. However, the share of grain sales direct from farms to corn and soybean processors increased continuously over the last decade, as compared to the 1996 and 2001 survey shares reported. Driven by the expanding biofuel industry, the market share of processors (including ethanol plants) for farms' corn sales almost doubled between the 1999 and 2006 marketing years. In contrast, the share of Iowa feeders and river terminals for corn sales by farms shrunk. This transformation is particularly significant in eastern Iowa and the North Central and Central Iowa CRDs. For soybeans, the share of direct sales from farms to processors more than doubled at the expense of the market share of country elevators and river terminals.

Although the market share of feeders in producers' corn sales declined significantly over the past six years, the combination of corn used for on-farm feeding, deliveries to other feeding operations by farms, and corn sales to livestock industry by country elevators show that Iowa livestock feeders still remained the single-largest end user of corn in the 2006 marketing year. As expected, the competition for local corn between Iowa feeders and the ethanol industry is likely to continue, as additional ethanol plants have been under construction or have been planned in all CRDs (see Figure 24).

Compared to the 1999 marketing year survey information, grains shipped by semis from Iowa farms increased drastically, and the trend is expected to continue into the future. Meanwhile, the share of wagons used by Iowa grain producers for corn and soybean shipments declined. The expansion of semi ownership provides grain producers more mobility and market power. Also, the significant and fast-growing share of semi hauls off farms indicates that an increasing number of heavier vehicles will travel on county roads and state highways, implying a greater demand for road maintenance and the more critical importance of infrastructure planning.

Regarding the destination markets selected by country elevators, a sizeable amount of corn went to ethanol plants during the 2006 marketing year. The share of corn sold to river terminals by

country elevators dropped significantly over the past six years because of strong competition from local feeders and ethanol plants. Soybean shipments from country elevators to crushers declined between the 1999 and 2006 marketing years. Growth in export markets, such as Mexico and Asia, drew more soybeans away from local markets. Grain elevators are still expected to serve as the major hubs for long-distance hauls destined for remote markets.

The expanding ethanol industry is likely to have two-sided impact on country elevators: country elevators' share in local corn markets declined, as direct deliveries off farms to processors/ethanol plants increased; however, country elevators also benefited from the ethanol industry because of the emerging sales of ethanol co-products, for example, DDG or WDG. It will be interesting to follow up on this trade-off in the Phase II study.

As the share of local markets for country elevators has grown, truck utilization has also gained favor over the rail line service for country elevators. The share of rail hauls from country elevators declined in most of the CRDs in Iowa between 1999 and 2006. A typical rail haul size for country elevators is between 25 and 49 rail cars; while almost one-quarter of respondents chose unit trains for rail shipments. The 2000 survey showed an upward and continuing trend for using larger trucks. Current survey results affirm that the number of 24-ton semis operated by country elevators has increased over the past seven years and is expected to continue to grow through 2012. This robust growth suggests that the restructuring of Iowa's feed industry will continue.

The rapidly expanding ethanol industry in Iowa has a significant impact on corn utilization in the state. Ethanol plants drew a considerable amount of corn away from traditional destination markets, such as feeders or export markets. A major portion of corn supplies came from in-state sources, while the sales of Iowa ethanol and DDG were dominated by out-of-state buyers. A sizeable share of ethanol and DDG sales went to the western United States, while the Southern Plains states absorbed a good share of ethanol sold by Iowa. Results also suggest that a significant share of Iowa ethanol was sold to Midwestern states such as Minnesota and Nebraska. The sales to surrounding states will be explicitly explored in the Phase II survey of this study.

Most ethanol plants did not extract corn oil in the 2006 marketing year. However, given the strong performance of the vegetable oil market, more ethanol plants are expected to adopt this process. The increase in corn oil production would generate more revenue for ethanol plants, while it would also provide an additional feedstock source to Iowa biodiesel refineries.

For in-state ethanol and co-product sales, trucking was the dominant shipping mode in the 2006/07 marketing year. Almost 60 percent of out-of-state ethanol sales were transported by rail, which is similar to the national average (USDA, 2007). For ethanol sales to surrounding states, this could provide a great opportunity to class II and III railroad carriers because of their flexibility and value-added services (Wu and Markham, 2008).

Soybean processors received most of their soybeans from in-state sources, and the soybeans were primarily moved by truck in the 2006/07 marketing year. Most of the soybean meal sales went to in-state feeders, while Southern Plains states purchased more than 10 percent. Trucks were mostly used for in-state sales, while rail lines were generally used for out-of-state deliveries.

Food use accounted for a big share of soybean oil sales; however, industry use also took up to one-quarter of sales, likely contributed by the expanding biodiesel industry. As with soybean meal, in-state soybean oil sales were handled by trucks, whereas long-distance oil sales were moved by rail.

The biodiesel industry is emerging as another biofuel industry in Iowa, although on a smaller scale than ethanol. Soybean oil was the major feedstock, while animal fat was not widely used for biodiesel production in the 2006 marketing year. However, animal fat or waste cooking oils could be potential feedstocks because of high vegetable oil prices. Soybean oil was primarily purchased from in-state processors and transported by truck. Nearly half of Iowa's biodiesel was sold in-state, while the Pacific Northwest, Southern Plains, and states surrounding Iowa also represented a sizeable share of biodiesel sales. International exports received a small portion of Iowa biodiesel. In contrast, more than three-quarter of the co-product (glycerin) was sent to export markets, while in-state sales accounted for about one-fifth. Surprisingly, trucks were commonly used for both in-state and out-of-state deliveries; however, sales to export markets still relied on rail lines.

Evaluations of transportation infrastructures and likely hindrances to marketing were generally consistent among the five groups surveyed. The interstate system received the highest ratings, while unimproved gravel roads were usually the most criticized. Rail lines were also rated below average by most of the respondents from biofuel plants and grain processors. The most recognized hindrance to marketing by those surveyed was surging transport costs. Transport costs usually account for a significant portion of the sales price of agricultural products, so high energy costs have had a considerable impact on marketing. A shortage of seasonal labor and storage capacity were also cited by country elevators as big challenges because of the large harvest in 2006. Rail and barge service access and reliability were also significant concerns for grain processors.

**Table 1. Iowa grain flow survey participation**

| Survey section | Sample | Useable returns | Response rate |
|---|---|---|---|
| Grain marketers | 4,000 | 1,234 | 30.9% |
| Grain handlers | 981 | 353 | 35.2% |
| Corn processors/ethanol | 32 | 13 | 40.6% |
| Soybean processors | 30 | 11 | 36.7% |
| Biodiesel | 13 | 9 | 69.2% |

**Table 2. Current and projected grain hauling vehicles**

| Vehicle type | Current Number | 2012 Projection | Change |
|---|---|---|---|
| Wagon – less than 500 Bu. | 95,867 | 54,284 | -43% |
| Wagon – 500 Bu. or more | 38,378 | 40,605 | 6% |
| Single axle truck | 8,284 | 4,321 | -48% |
| Tandem axle truck | 8,332 | 6,885 | -17% |
| Semi | 16,972 | 21,187 | 25% |
| Other | 1,516 | 1,027 | -32% |

**Table 3. Average and maximum distances of grain movement by farmers**

| Vehicle type | Corn | | Soybean | |
|---|---|---|---|---|
| | Average | Maximum | Average | Maximum |
| | (miles) | | | |
| Wagon – less than 500 Bu. | 4 | 6 | 4 | 7 |
| Wagon – 500 Bu. or more | 5 | 8 | 5 | 8 |
| Single axle truck | 7 | 13 | 8 | 12 |
| Tandem axle truck | 11 | 17 | 11 | 18 |
| Semi | 23 | 47 | 26 | 49 |
| Other | 3 | 10 | 3 | 7 |

**Table 4. Road types and miles to most frequently used market**

| Road Type | Corn | Soybean |
|---|---|---|
| Unimproved gravel roads | 7 | 4 |
| Paved county roads | 9 | 7 |
| State highways | 22 | 23 |

**Table 5. Rating Iowa's freight infrastructure by grain marketers**

| Transportation system | Poor | | Average | | Excellent | | |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | N/A | No response |
| Rail lines | 10% | 10% | 39% | 17% | 4% | 9% | 12% |
| Interstates | 1% | 3% | 29% | 39% | 12% | 4% | 11% |
| Primary state highways | 3% | 10% | 38% | 33% | 6% | 1% | 11% |
| Paved county roads | 5% | 14% | 37% | 28% | 5% | 1% | 10% |
| Unimproved gravel roads | 9% | 20% | 36% | 20% | 3% | 1% | 11% |
| Waterways | 6% | 12% | 27% | 12% | 2% | 23% | 17% |

**Table 6. Rating infrastructure by grain marketers (excluding not applicable and no response)**

| Transportation system | Poor | | Average | | Excellent |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Rail lines | 12% | 12% | 49% | 22% | 5% |
| Interstates | 1% | 4% | 34% | 46% | 14% |
| Primary state highways | 3% | 11% | 43% | 37% | 7% |
| Paved county roads | 5% | 16% | 41% | 32% | 6% |
| Unimproved gravel roads | 10% | 23% | 41% | 23% | 4% |
| Waterways | 9% | 21% | 45% | 21% | 4% |

**Table 7. Rating hindrances to efficient grain marketing by grain marketers**

| Marketing hindrances | Not at all | | Somewhat | | Definitely | | |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | N/A | No Response |
| Grain hauling equipment size | 39% | 14% | 23% | 5% | 6% | 3% | 11% |
| Road weight restrictions | 31% | 13% | 24% | 9% | 10% | 3% | 11% |
| Bridge weight restrictions | 29% | 12% | 20% | 11% | 13% | 4% | 11% |
| Availability of seasonal labor | 27% | 14% | 23% | 12% | 9% | 5% | 11% |
| Lack of on-farm storage | 25% | 18% | 26% | 12% | 8% | 2% | 11% |
| Elevator storage capacity | 32% | 19% | 19% | 10% | 5% | 4% | 11% |
| Elevator unloading time | 26% | 17% | 22% | 11% | 10% | 4% | 10% |
| Distance to market | 28% | 22% | 24% | 9% | 6% | 1% | 11% |
| Trucking costs | 14% | 11% | 26% | 19% | 16% | 4% | 11% |
| Rail access | 23% | 13% | 17% | 10% | 11% | 15% | 11% |
| Rail service reliability | 19% | 11% | 17% | 12% | 11% | 18% | 12% |
| Rail service costs | 16% | 8% | 17% | 11% | 13% | 20% | 14% |

**Table 8. Rating hindrances by grain marketers (excluding not applicable and no response)**

| Marketing hindrances | Not at all | | Somewhat | | Definitely |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Grain hauling equipment size | 45% | 16% | 27% | 6% | 6% |
| Road weight restrictions | 36% | 15% | 27% | 10% | 11% |
| Bridge weight restrictions | 34% | 14% | 23% | 13% | 15% |
| Availability of seasonal labor | 31% | 17% | 28% | 14% | 10% |
| Lack of on-farm storage | 29% | 20% | 29% | 13% | 9% |
| Elevator storage capacity | 38% | 23% | 22% | 11% | 6% |
| Elevator unloading time | 30% | 20% | 25% | 13% | 12% |
| Distance to market | 31% | 25% | 27% | 10% | 7% |
| Trucking costs | 16% | 13% | 31% | 22% | 19% |
| Rail access | 31% | 17% | 23% | 13% | 15% |
| Rail service reliability | 27% | 16% | 25% | 17% | 16% |
| Rail service costs | 25% | 12% | 25% | 17% | 20% |

**Table 9. Number of rail cars utilized by country elevators per shipment**

| Crop | Number of rail cars | | | | |
|---|---|---|---|---|---|
| | 1-24 | 25-49 | 50-74 | 75-99 | 100+ |
| Corn | 24% | 35% | 10% | 7% | 24% |
| Soybeans | 22% | 42% | 7% | 7% | 22% |

**Table 10. Number of feed delivery trucks by size owned by country elevators**

| Year | Size of feed delivery trucks | | | |
|---|---|---|---|---|
| | 6 Ton | 12 Ton | 18 Ton | 24 Ton |
| 2006 | 141 | 135 | 149 | 229 |
| 2012 | 95 | 122 | 135 | 272 |

**Table 11. Estimated traveling distance of feed delivery trucks by size**

| Distance | Size of feed delivery trucks | | | |
|---|---|---|---|---|
| | 6 Ton | 12 Ton | 18 Ton | 24 Ton |
| Average one-way miles | 13 | 17 | 24 | 34 |
| Maximum one-way miles | 34 | 42 | 56 | 85 |

**Table 12. Rating Iowa's freight infrastructure by country elevators**

| Transportation system | Poor | | Average | | Excellent | | |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | N/A | No Response |
| Rail lines | 4% | 9% | 33% | 8% | 0% | 36% | 11% |
| Interstates | 1% | 2% | 42% | 41% | 6% | 4% | 5% |
| Primary state highways | 2% | 15% | 48% | 25% | 6% | 1% | 3% |
| Paved county roads | 4% | 22% | 44% | 24% | 2% | 1% | 4% |
| Unimproved gravel roads | 10% | 26% | 46% | 12% | 1% | 2% | 5% |
| Waterways | 2% | 6% | 29% | 7% | 0% | 43% | 13% |

**Table 13. Rating infrastructure by country elevators (excluding not applicable and no response)**

| Transportation system | Poor | | Average | | Excellent |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Rail lines | 7% | 16% | 61% | 16% | 0% |
| Interstates | 1% | 2% | 46% | 44% | 6% |
| Primary state highways | 2% | 16% | 50% | 26% | 6% |
| Paved county roads | 4% | 23% | 46% | 25% | 2% |
| Unimproved gravel roads | 11% | 27% | 49% | 12% | 1% |
| Waterways | 4% | 15% | 65% | 16% | 1% |

**Table 14. Rating hindrances to efficient marketing by country elevators**

| Marketing hindrances | Not at all | | Somewhat | | Definitely | | |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | N/A | No Response |
| Road weight restrictions | 21% | 26% | 29% | 8% | 10% | 2% | 4% |
| Bridge weight restrictions | 18% | 18% | 30% | 14% | 12% | 5% | 3% |
| Availability of seasonal labor | 10% | 12% | 25% | 21% | 26% | 4% | 2% |
| Elevator storage capacity | 7% | 11% | 30% | 24% | 21% | 5% | 3% |
| Elevator unloading time | 15% | 27% | 24% | 15% | 13% | 4% | 3% |
| Trucking costs | 4% | 11% | 24% | 28% | 28% | 2% | 3% |
| Rail access | 18% | 17% | 12% | 5% | 12% | 33% | 3% |
| Rail service reliability | 12% | 7% | 14% | 9% | 10% | 44% | 4% |
| Rail service costs | 13% | 6% | 10% | 8% | 15% | 44% | 4% |
| Barge access | 24% | 7% | 6% | 4% | 3% | 52% | 4% |
| Barge service reliability | 22% | 7% | 6% | 3% | 1% | 58% | 4% |
| Barge service costs | 16% | 5% | 8% | 5% | 4% | 56% | 5% |
| Other hindrances | 3% | 1% | 0% | 0% | 2% | 26% | 68% |

**Table 15. Rating hindrances by country elevators (excluding not applicable and no response)**

| Marketing hindrances | Not at all | | Somewhat | | Definitely |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Road weight restrictions | 22% | 28% | 31% | 8% | 11% |
| Bridge weight restrictions | 19% | 20% | 32% | 16% | 13% |
| Availability of seasonal labor | 10% | 13% | 27% | 22% | 28% |
| Elevator storage capacity | 8% | 11% | 33% | 26% | 22% |
| Elevator unloading time | 16% | 29% | 25% | 16% | 14% |
| Trucking costs | 4% | 11% | 25% | 30% | 30% |
| Rail access | 28% | 27% | 19% | 7% | 18% |
| Rail service reliability | 23% | 14% | 27% | 17% | 19% |
| Rail service costs | 24% | 12% | 20% | 16% | 28% |
| Barge access | 55% | 17% | 14% | 8% | 6% |
| Barge service reliability | 55% | 18% | 16% | 8% | 3% |
| Barge service costs | 44% | 12% | 21% | 14% | 9% |
| Other hindrances | 50% | 13% | 6% | 0% | 31% |

**Table 16. Rating Iowa's freight infrastructure by corn processors**

| | Poor | | Average | | Excellent | | |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | N/A | No Response |
| Rail lines | 0% | 23% | 38% | 31% | 0% | 8% | 0% |
| Interstates | 0% | 8% | 23% | 38% | 31% | 0% | 0% |
| Primary state highways | 0% | 8% | 54% | 31% | 8% | 0% | 0% |
| Paved county roads | 0% | 15% | 38% | 46% | 0% | 0% | 0% |
| Unimproved gravel roads | 0% | 15% | 54% | 31% | 0% | 0% | 0% |
| Waterways | 0% | 0% | 38% | 8% | 0% | 54% | 0% |

**Table 17. Rating infrastructure by corn processors (excluding not applicable and no response)**

| | Poor | | Average | | Excellent |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Rail lines | 0% | 25% | 42% | 33% | 0% |
| Interstates | 0% | 8% | 23% | 38% | 31% |
| Primary state highways | 0% | 8% | 54% | 31% | 8% |
| Paved county roads | 0% | 15% | 38% | 46% | 0% |
| Unimproved gravel roads | 0% | 15% | 54% | 31% | 0% |
| Waterways | 0% | 0% | 83% | 17% | 0% |

**Table 18. Rating hindrances to efficient marketing by corn processors**

| | Not at all | | Somewhat | | Definitely | | |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | N/A | No Response |
| Road weight restrictions | 8% | 23% | 46% | 8% | 15% | 0% | 0% |
| Bridge weight restrictions | 15% | 8% | 31% | 8% | 15% | 23% | 0% |
| Storage capacity | 8% | 23% | 15% | 38% | 15% | 0% | 0% |
| Unloading time | 31% | 38% | 15% | 8% | 8% | 0% | 0% |
| Trucking costs | 0% | 31% | 23% | 31% | 15% | 0% | 0% |
| Rail access | 23% | 15% | 23% | 8% | 23% | 8% | 0% |
| Rail service reliability | 15% | 8% | 23% | 23% | 23% | 8% | 0% |
| Rail service costs | 0% | 15% | 15% | 15% | 46% | 8% | 0% |
| Barge access | 23% | 0% | 0% | 0% | 15% | 62% | 0% |
| Barge service reliability | 15% | 8% | 0% | 0% | 15% | 62% | 0% |
| Barge service costs | 15% | 8% | 0% | 0% | 15% | 62% | 0% |

**Table 19. Rating hindrances by corn processors (excluding not applicable and no response)**

| | Not at all | | Somewhat | | Definitely |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Road weight restrictions | 8% | 23% | 46% | 8% | 15% |
| Bridge weight restrictions | 20% | 10% | 40% | 10% | 20% |
| Storage capacity | 8% | 23% | 15% | 38% | 15% |
| Unloading time | 31% | 38% | 15% | 8% | 8% |
| Trucking costs | 0% | 31% | 23% | 31% | 15% |
| Rail access | 25% | 17% | 25% | 8% | 25% |
| Rail service reliability | 17% | 8% | 25% | 25% | 25% |
| Rail service costs | 0% | 17% | 17% | 17% | 50% |
| Barge access | 60% | 0% | 0% | 0% | 40% |
| Barge service reliability | 40% | 20% | 0% | 0% | 40% |
| Barge service costs | 40% | 20% | 0% | 0% | 40% |

**Table 20. Rating Iowa's freight infrastructure by soybean processors**

| | Poor | | Average | | Excellent | | |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | N/A | No Response |
| Rail lines | 9% | 9% | 36% | 18% | 0% | 9% | 18% |
| Interstates | 0% | 0% | 27% | 36% | 27% | 0% | 9% |
| Primary state highways | 0% | 0% | 46% | 36% | 9% | 0% | 9% |
| Paved county roads | 9% | 9% | 46% | 18% | 9% | 0% | 9% |
| Unimproved gravel roads | 9% | 36% | 18% | 18% | 0% | 9% | 9% |
| Waterways | 0% | 0% | 18% | 0% | 0% | 73% | 9% |

**Table 21. Rating infrastructure by soybean processors (excluding not applicable and no responses)**

| | Poor | | Average | | Excellent |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Rail lines | 13% | 13% | 50% | 25% | 0% |
| Interstates | 0% | 0% | 30% | 40% | 30% |
| Primary state highways | 0% | 0% | 50% | 40% | 10% |
| Paved county roads | 10% | 10% | 50% | 20% | 10% |
| Unimproved gravel roads | 11% | 44% | 22% | 22% | 0% |
| Waterways | 0% | 0% | 100% | 0% | 0% |

**Table 22. Rating hindrances to efficient marketing by soybean processors**

| | Not at all | | Somewhat | | Definitely | | |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | N/A | No Response |
| Road weight restrictions | 9% | 27% | 27% | 9% | 18% | 0% | 9% |
| Bridge weight restrictions | 18% | 27% | 18% | 9% | 18% | 0% | 9% |
| Storage capacity | 9% | 9% | 36% | 9% | 27% | 0% | 9% |
| Unloading time | 9% | 9% | 46% | 9% | 18% | 0% | 9% |
| Trucking costs | 0% | 0% | 18% | 27% | 46% | 0% | 9% |
| Rail access | 0% | 0% | 36% | 9% | 46% | 0% | 9% |
| Rail service reliability | 0% | 9% | 9% | 18% | 55% | 0% | 9% |
| Rail service costs | 0% | 0% | 9% | 18% | 64% | 0% | 9% |
| Barge access | 9% | 9% | 0% | 0% | 9% | 64% | 9% |
| Barge service reliability | 9% | 9% | 0% | 0% | 9% | 64% | 9% |
| Barge service costs | 9% | 9% | 0% | 0% | 9% | 64% | 9% |

**Table 23. Rating hindrances by soybean processors (excluding not applicable and no responses)**

| | Not at all | | Somewhat | | Definitely |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Road weight restrictions | 10% | 30% | 30% | 10% | 20% |
| Bridge weight restrictions | 20% | 30% | 20% | 10% | 20% |
| Storage capacity | 10% | 10% | 40% | 10% | 30% |
| Unloading time | 10% | 10% | 50% | 10% | 20% |
| Trucking costs | 0% | 0% | 20% | 30% | 50% |
| Rail access | 0% | 0% | 40% | 10% | 50% |
| Rail service reliability | 0% | 10% | 10% | 20% | 60% |
| Rail service costs | 0% | 0% | 10% | 20% | 70% |
| Barge access | 33% | 33% | 0% | 0% | 33% |
| Barge service reliability | 33% | 33% | 0% | 0% | 33% |
| Barge service costs | 33% | 33% | 0% | 0% | 33% |

**Table 24. Rating Iowa's freight infrastructure by biodiesel producers**

| | Poor | | Average | | Excellent | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | N/A |
| Rail lines | 0% | 20% | 30% | 30% | 0% | 20% |
| Interstates | 0% | 0% | 40% | 30% | 30% | 0% |
| Primary state highways | 0% | 0% | 50% | 40% | 10% | 0% |
| Paved county roads | 0% | 20% | 40% | 30% | 0% | 10% |
| Unimproved gravel roads | 10% | 0% | 60% | 20% | 0% | 10% |
| Waterways | 0% | 0% | 20% | 10% | 0% | 70% |

**Table 25. Rating infrastructure by biodiesel producers (excluding not applicable and no response)**

| | Poor | | Average | | Excellent |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Rail lines | 0% | 25% | 38% | 38% | 0% |
| Interstates | 0% | 0% | 40% | 30% | 30% |
| Primary state highways | 0% | 0% | 50% | 40% | 10% |
| Paved county roads | 0% | 22% | 44% | 33% | 0% |
| Unimproved gravel roads | 11% | 0% | 67% | 22% | 0% |
| Waterways | 0% | 0% | 67% | 33% | 0% |

**Table 26. Rating hindrances to efficient marketing by biodiesel producers**

| | Not at all | | Somewhat | | Definitely | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | N/A |
| Road weight restrictions | 70% | 10% | 20% | 0% | 0% | 0% |
| Bridge weight restrictions | 70% | 10% | 20% | 0% | 0% | 0% |
| Storage capacity | 20% | 20% | 50% | 10% | 0% | 0% |
| Unloading time | 80% | 10% | 10% | 0% | 0% | 0% |
| Trucking costs | 0% | 10% | 70% | 0% | 20% | 0% |
| Rail access | 20% | 20% | 50% | 0% | 10% | 0% |
| Rail service reliability | 15% | 20% | 30% | 20% | 0% | 10% |
| Rail service costs | 0% | 10% | 40% | 10% | 10% | 10% |
| Barge access | 23% | 10% | 20% | 0% | 10% | 30% |
| Barge service reliability | 15% | 10% | 20% | 0% | 0% | 40% |
| Barge service costs | 15% | 10% | 10% | 10% | 0% | 40% |

**Table 27. Rating hindrances by biodiesel producers (excluding not applicable and no response)**

| | Not at all | | Somewhat | | Definitely |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Road weight restrictions | 70% | 10% | 20% | 0% | 0% |
| Bridge weight restrictions | 70% | 10% | 20% | 0% | 0% |
| Storage capacity | 20% | 20% | 50% | 10% | 0% |
| Unloading time | 80% | 10% | 10% | 0% | 0% |
| Trucking costs | 0% | 10% | 70% | 0% | 20% |
| Rail access | 20% | 20% | 50% | 0% | 10% |
| Rail service reliability | 18% | 24% | 35% | 24% | 0% |
| Rail service costs | 0% | 14% | 57% | 14% | 14% |
| Barge access | 37% | 16% | 32% | 0% | 16% |
| Barge service reliability | 33% | 22% | 44% | 0% | 0% |
| Barge service costs | 33% | 22% | 22% | 22% | 0% |

**Table 28. Number of farm and country elevators sampled and usable responses by CRD**

| | Number of farms | | Number of country elevators | |
|---|---|---|---|---|
| | Sample | Usable responses | Sample | Usable responses |
| Northwest | 652 | 195 | 139 | 51 |
| North Central | 584 | 194 | 123 | 49 |
| Northeast | 399 | 128 | 113 | 47 |
| West Central | 602 | 169 | 122 | 37 |
| Central | 558 | 182 | 169 | 58 |
| East Central | 394 | 131 | 123 | 48 |
| Southwest | 336 | 81 | 68 | 19 |
| South Central | 192 | 57 | 46 | 14 |
| Southeast | 283 | 97 | 100 | 30 |

**Table 29. CRD corn data**

| | Corn planted acres | Corn production | Corn sold | Corn used on farm | Corn not sold or used |
|---|---|---|---|---|---|
| | (million acres) | (million bushels) | | | |
| Northwest | 1.955 | 298.2 | 79.0% | 14.1% | 6.9% |
| North Central | 1.822 | 314.8 | 85.3% | 6.3% | 8.5% |
| Northeast | 1.499 | 253.3 | 74.6% | 21.2% | 4.2% |
| West Central | 1.867 | 271.3 | 85.6% | 8.4% | 6.0% |
| Central | 1.839 | 324.5 | 86.7% | 4.7% | 8.5% |
| East Central | 1.283 | 218.2 | 75.7% | 15.9% | 8.3% |
| Southwest | 0.996 | 157.8 | 81.2% | 10.6% | 8.2% |
| South Central | 0.497 | 74.2 | 89.1% | 6.7% | 4.2% |
| Southeast | 0.842 | 137.8 | 87.4% | 6.4% | 6.3% |

**Table 30. Percentage of market for CRD corn producers**

| | Northwest | North Central | Northeast | West Central | Central | East Central | Southwest | South Central | Southeast |
|---|---|---|---|---|---|---|---|---|---|
| Cooperative elevators | 66.4% | 66.9% | 33.0% | 60.1% | 53.1% | 21.3% | 27.4% | 37.2% | 7.7% |
| Private elevators | 11.7% | 12.6% | 18.4% | 6.4% | 5.8% | 10.8% | 36.8% | 10.8% | 27.5% |
| Iowa ethanol plants | 16.9% | 14.1% | 12.8% | 16.9% | 27.1% | 5.6% | 10.0% | 10.9% | 11.8% |
| Out-of-state ethanol plants | 1.5% | 0.5% | 0.0% | 3.8% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Iowa processors | 0.1% | 2.3% | 10.3% | 0.2% | 9.0% | 27.6% | 1.8% | 31.4% | 27.2% |
| Out-of-state processors | 0.0% | 0.0% | 0.0% | 9.0% | 0.0% | 0.0% | 2.9% | 0.0% | 1.8% |
| Illinois River terminals | 0.0% | 0.1% | 0.7% | 0.0% | 0.0% | 0.0% | 0.0% | 0.3% | 0.4% |
| Mississippi River terminals | 0.0% | 0.8% | 15.5% | 0.0% | 0.8% | 29.5% | 0.0% | 0.9% | 20.1% |
| Missouri River terminals | 0.3% | 0.0% | 0.0% | 1.0% | 0.0% | 0.0% | 14.7% | 0.0% | 0.0% |
| Iowa farm operation | 2.9% | 1.3% | 0.9% | 0.6% | 3.5% | 0.1% | 2.1% | 1.9% | 1.4% |
| Out-of-state farm operation | 0.0% | 0.0% | 0.0% | 0.1% | 0.0% | 0.0% | 0.0% | 6.7% | 0.0% |
| Destination unknown | 0.1% | 1.4% | 8.3% | 1.8% | 0.8% | 5.1% | 4.3% | 0.0% | 2.2% |

**Table 31. Share of corn shipments from farms by vehicle size in CRD**

| | Wagon - less than 500 bu. | Wagon - 500 bu. or more | Single axle truck | Tandem axle truck | Semi |
|---|---|---|---|---|---|
| Northwest | 12% | 25% | 4% | 8% | 52% |
| North Central | 13% | 21% | 1% | 7% | 58% |
| Northeast | 7% | 10% | 1% | 10% | 73% |
| West Central | 7% | 11% | 6% | 10% | 67% |
| Central | 5% | 19% | 3% | 10% | 63% |
| East Central | 8% | 8% | 1% | 4% | 80% |
| Southwest | 2% | 6% | 2% | 3% | 87% |
| South Central | 1% | 5% | 0% | 7% | 87% |
| Southeast | 2% | 3% | 5% | 4% | 86% |

**Table 32. CRD soybean data**

| | Soybean planted acres | Soybean production | Soybeans sold | Soybeans used on farm | Soybeans not sold or used |
|---|---|---|---|---|---|
| | (million acres) | (million bushels) | | | |
| Northwest | 1.607 | 83.5 | 90.3% | 1.1% | 8.7% |
| North Central | 1.373 | 70.6 | 93.2% | 0.2% | 6.7% |
| Northeast | 0.881 | 45.4 | 93.9% | 1.4% | 4.7% |
| West Central | 1.590 | 76.0 | 94.0% | 1.4% | 4.6% |
| Central | 1.482 | 77.7 | 93.4% | 0.0% | 6.5% |
| East Central | 0.971 | 49.7 | 90.8% | 1.1% | 8.0% |
| Southwest | 0.952 | 47.3 | 91.3% | 0.1% | 8.6% |
| South Central | 0.520 | 23.4 | 97.1% | 0.0% | 2.9% |
| Southeast | 0.774 | 36.4 | 95.8% | 0.0% | 4.2% |

**Table 33. Percentage of market for CRD soybean producers**

| | Northwest | North Central | Northeast | West Central | Central | East Central | Southwest | South Central | Southeast |
|---|---|---|---|---|---|---|---|---|---|
| Cooperative elevators | 70.5% | 66.3% | 42.5% | 67.7% | 60.9% | 28.3% | 24.2% | 39.0% | 8.2% |
| Private elevators | 9.9% | 8.1% | 15.4% | 7.8% | 7.8% | 11.5% | 28.4% | 20.8% | 22.7% |
| Iowa crushers | 80.4% | 74.4% | 57.9% | 75.5% | 68.7% | 39.8% | 52.6% | 59.7% | 30.9% |
| Out-of-State crushers | 9.9% | 11.0% | 11.5% | 16.9% | 22.6% | 21.2% | 30.1% | 34.8% | 20.0% |
| Illinois River terminals | 2.6% | 1.0% | 0.0% | 0.0% | 0.8% | 1.1% | 0.6% | 2.4% | 8.7% |
| Mississippi River terminals | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.2% | 0.0% | 0.0% | 0.0% |
| Missouri River terminals | 0.0% | 1.8% | 18.4% | 0.0% | 0.0% | 29.6% | 0.0% | 0.0% | 28.3% |
| Unknown destination | 0.0% | 0.0% | 0.0% | 0.3% | 0.0% | 1.2% | 7.9% | 0.0% | 0.0% |

**Table 34. Share of soybean shipments from farms by vehicle size in CRD**

| | Wagon - less than 500 Bu. | Wagon - 500 Bu. or more | Single axle truck | Tandem axle truck | Semi |
|---|---|---|---|---|---|
| Northwest | 13% | 29% | 4% | 7% | 48% |
| North Central | 17% | 22% | 1% | 9% | 51% |
| Northeast | 9% | 12% | 2% | 9% | 68% |
| West Central | 8% | 14% | 6% | 12% | 61% |
| Central | 6% | 19% | 5% | 11% | 59% |
| East Central | 10% | 12% | 1% | 4% | 73% |
| Southwest | 6% | 4% | 2% | 6% | 82% |
| South Central | 5% | 5% | 0% | 7% | 84% |
| Southeast | 2% | 3% | 6% | 4% | 84% |

**Table 35. Average distance from farms to market by road in CRD**

| | Unimproved gravel road | | Paved county road | | State highway | |
|---|---|---|---|---|---|---|
| | Corn | Soybeans | Corn | Soybeans | Corn | Soybeans |
| Northwest | 4 | 3 | 7 | 6 | 10 | 10 |
| North Central | 11 | 3 | 13 | 6 | 14 | 17 |
| Northeast | 4 | 4 | 8 | 10 | 22 | 30 |
| West Central | 4 | 4 | 6 | 6 | 20 | 18 |
| Central | 15 | 7 | 13 | 7 | 29 | 20 |
| East Central | 3 | 3 | 7 | 7 | 19 | 22 |
| Southwest | 4 | 4 | 10 | 10 | 24 | 29 |
| South Central | 8 | 8 | 16 | 16 | 61 | 60 |
| Southeast | 4 | 4 | 9 | 9 | 22 | 34 |

**Table 36. Average distance for grain movement from farms by vehicle in CRD**

| | | Northwest | North Central | Northeast | West Central | Central | East Central | Southwest | South Central | Southeast |
|---|---|---|---|---|---|---|---|---|---|---|
| Wagon - less than 500 bu. | Corn | 4 | 5 | 5 | 5 | 5 | 3 | 4 | 4 | 3 |
| | Soybeans | 4 | 5 | 6 | 5 | 5 | 3 | 4 | 4 | 3 |
| Wagon - 500 bu. or more | Corn | 5 | 6 | 5 | 5 | 5 | 7 | 4 | 6 | 4 |
| | Soybeans | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 8 | 4 |
| Single axle truck | Corn | 6 | 8 | 6 | 7 | 8 | 5 | 18 | 7 | 9 |
| | Soybeans | 6 | 7 | 7 | 6 | 9 | 5 | 17 | 7 | 11 |
| Tandem axle truck | Corn | 10 | 10 | 10 | 11 | 9 | 10 | 16 | 10 | 14 |
| | Soybeans | 11 | 9 | 10 | 11 | 11 | 13 | 12 | 13 | 17 |
| Semi | Corn | 16 | 19 | 26 | 28 | 18 | 22 | 31 | 30 | 32 |
| | Soybeans | 15 | 22 | 30 | 24 | 20 | 27 | 42 | 30 | 41 |

**Table 37. Maximum distance for grain movement from farms by vehicle in CRD**

| | | Northwest | North Central | Northeast | West Central | Central | East Central | Southwest | South Central | Southeast |
|---|---|---|---|---|---|---|---|---|---|---|
| Wagon - less than 500 bu. | Corn | 7 | 7 | 7 | 6 | 6 | 5 | 6 | 5 | 6 |
| | Soybeans | 7 | 7 | 7 | 7 | 6 | 6 | 6 | 14 | 6 |
| Wagon - 500 bu. or more | Corn | 9 | 9 | 8 | 7 | 8 | 8 | 7 | 14 | 8 |
| | Soybeans | 8 | 9 | 8 | 7 | 8 | 8 | 7 | 12 | 8 |
| Single axle truck | Corn | 11 | 16 | 14 | 10 | 7 | 7 | 27 | 21 | 16 |
| | Soybeans | 8 | 16 | 14 | 8 | 7 | 8 | 31 | 21 | 16 |
| Tandem axle truck | Corn | 18 | 16 | 18 | 13 | 20 | 19 | 21 | 14 | 23 |
| | Soybeans | 19 | 18 | 18 | 13 | 19 | 22 | 9 | 19 | 31 |
| Semi | Corn | 31 | 46 | 57 | 50 | 43 | 39 | 59 | 73 | 53 |
| | Soybeans | 33 | 51 | 54 | 46 | 38 | 47 | 69 | 58 | 67 |

**Table 38. Farms' grain hauling vehicles by CRD**

| | Northwest | North Central | Northeast | West Central | Central | East Central | Southwest | South Central | Southeast |
|---|---|---|---|---|---|---|---|---|---|
| Currently | | | | | (number of vehicles) | | | | |
| Wagon - less than 500 bu. | 15,684 | 17,757 | 14,899 | 8,787 | 8,650 | 12,881 | 3,565 | 4,443 | 9,201 |
| Wagon - 500 bu. or more | 6,369 | 8,502 | 4,315 | 3,937 | 6,916 | 3,677 | 1,603 | 651 | 2,407 |
| Single axle truck | 727 | 528 | 921 | 1,883 | 1,451 | 895 | 570 | 366 | 943 |
| Tandem axle truck | 1,149 | 1,512 | 856 | 987 | 1,515 | 692 | 511 | 535 | 575 |
| Semi | 2,521 | 3,264 | 1,519 | 1,780 | 2,922 | 1,301 | 1,455 | 761 | 1,449 |
| By 2012 | | | | | | | | | |
| Wagon - less than 500 bu. | 9,993 | 10,621 | 8,093 | 4,688 | 4,077 | 8,683 | 829 | 1,958 | 5,341 |
| Wagon - 500 bu. or more | 6,915 | 9,716 | 6,028 | 3,375 | 6,765 | 3,877 | 1,270 | 411 | 2,249 |
| Single axle truck | 302 | 267 | 576 | 835 | 699 | 661 | 26 | 268 | 688 |
| Tandem axle truck | 1,033 | 1,197 | 982 | 937 | 881 | 815 | 296 | 372 | 372 |
| Semi | 3,169 | 4,083 | 2,108 | 3,089 | 3,265 | 1,734 | 1,594 | 825 | 1,322 |

**Table 39. Containerized shipments by grain producers in CRD**

| | Yes | No | Corn | Soybeans |
|---|---|---|---|---|
| | | | (million bushels) | |
| Northwest | 6.4% | 93.6% | 15.9 | 3.2 |
| North Central | 3.4% | 96.6% | 7.2 | 1.1 |
| Northeast | 5.2% | 94.8% | 11.7 | 1.6 |
| West Central | 2.6% | 97.4% | 2.5 | 0.0 |
| Central | 1.8% | 98.2% | 3.0 | 0.6 |
| East Central | 5.8% | 94.2% | 9.4 | 8.2 |
| Southwest | 6.7% | 93.3% | 8.2 | 2.4 |
| South Central | 2.0% | 98.0% | 0.5 | 0.0 |
| Southeast | 3.8% | 96.3% | 2.0 | 1.1 |

**Table 40. Rail lines ratings by grain producers in CRD**

| | Poor | | Average | | Excellent |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Northwest | 10% | 9% | 50% | 22% | 10% |
| North Central | 8% | 12% | 44% | 30% | 5% |
| Northeast | 21% | 20% | 40% | 18% | 2% |
| West Central | 4% | 12% | 45% | 30% | 10% |
| Central | 11% | 11% | 55% | 20% | 3% |
| East Central | 15% | 13% | 55% | 17% | 1% |
| Southwest | 15% | 11% | 53% | 18% | 3% |
| South Central | 24% | 17% | 51% | 7% | 0% |
| Southeast | 23% | 11% | 55% | 9% | 2% |

**Table 41. Interstate ratings by grain producers in CRD**

| | Poor | | Average | | Excellent |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Northwest | 3% | 3% | 31% | 47% | 17% |
| North Central | 1% | 2% | 30% | 52% | 14% |
| Northeast | 2% | 4% | 33% | 44% | 17% |
| West Central | 0% | 4% | 33% | 53% | 11% |
| Central | 1% | 1% | 32% | 48% | 18% |
| East Central | 1% | 5% | 41% | 43% | 10% |
| Southwest | 3% | 9% | 43% | 32% | 13% |
| South Central | 4% | 12% | 45% | 33% | 6% |
| Southeast | 0% | 3% | 34% | 49% | 14% |

**Table 42. Primary state highway ratings by grain producers in CRD**

| | Poor | | Average | | Excellent |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Northwest | 6% | 10% | 33% | 40% | 11% |
| North Central | 2% | 9% | 50% | 31% | 8% |
| Northeast | 3% | 13% | 44% | 33% | 7% |
| West Central | 4% | 13% | 44% | 33% | 6% |
| Central | 2% | 14% | 42% | 41% | 2% |
| East Central | 2% | 7% | 48% | 38% | 6% |
| Southwest | 3% | 16% | 38% | 34% | 9% |
| South Central | 0% | 8% | 51% | 39% | 2% |
| Southeast | 1% | 6% | 38% | 48% | 8% |

**Table 43. Paved county road ratings by grain producers in CRD**

| | Poor | | Average | | Excellent |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Northwest | 2% | 14% | 36% | 38% | 10% |
| North Central | 2% | 14% | 41% | 36% | 7% |
| Northeast | 13% | 20% | 41% | 22% | 5% |
| West Central | 7% | 16% | 41% | 30% | 7% |
| Central | 4% | 14% | 44% | 35% | 3% |
| East Central | 7% | 19% | 37% | 31% | 6% |
| Southwest | 9% | 16% | 54% | 17% | 4% |
| South Central | 2% | 32% | 40% | 22% | 4% |
| Southeast | 3% | 10% | 45% | 38% | 5% |

**Table 44. Unimproved gravel road ratings by grain producers in CRD**

| | Poor | | Average | | Excellent |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Northwest | 5% | 20% | 39% | 29% | 7% |
| North Central | 5% | 16% | 45% | 30% | 4% |
| Northeast | 13% | 32% | 35% | 18% | 3% |
| West Central | 13% | 25% | 33% | 26% | 4% |
| Central | 9% | 24% | 43% | 21% | 3% |
| East Central | 10% | 21% | 49% | 17% | 3% |
| Southwest | 18% | 25% | 42% | 13% | 3% |
| South Central | 24% | 24% | 38% | 14% | 0% |
| Southeast | 6% | 25% | 44% | 20% | 5% |

**Table 45. Waterway ratings by grain producers in CRD**

| | Poor | | Average | | Excellent |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Northwest | 7% | 20% | 48% | 18% | 6% |
| North Central | 9% | 15% | 51% | 21% | 4% |
| Northeast | 9% | 25% | 46% | 15% | 5% |
| West Central | 11% | 22% | 41% | 19% | 8% |
| Central | 8% | 22% | 43% | 25% | 2% |
| East Central | 11% | 20% | 43% | 26% | 1% |
| Southwest | 19% | 19% | 50% | 12% | 0% |
| South Central | 13% | 30% | 33% | 23% | 0% |
| Southeast | 5% | 20% | 45% | 23% | 6% |

**Table 46. Grain hauling equipment size ratings by grain producers in CRD**

| | Not at all | | Somewhat | | Definitely |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Northwest | 43% | 18% | 30% | 5% | 4% |
| North Central | 49% | 17% | 21% | 8% | 6% |
| Northeast | 46% | 14% | 24% | 7% | 9% |
| West Central | 41% | 15% | 30% | 5% | 9% |
| Central | 50% | 13% | 26% | 6% | 5% |
| East Central | 45% | 20% | 25% | 4% | 7% |
| Southwest | 51% | 6% | 31% | 4% | 7% |
| South Central | 42% | 15% | 25% | 10% | 8% |
| Southeast | 38% | 22% | 30% | 4% | 6% |

**Table 47. Road weight restriction ratings by grain producers in CRD**

| | Not at all | | Somewhat | | Definitely |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Northwest | 40% | 17% | 23% | 9% | 10% |
| North Central | 41% | 15% | 23% | 12% | 10% |
| Northeast | 35% | 21% | 24% | 10% | 11% |
| West Central | 34% | 13% | 31% | 9% | 13% |
| Central | 39% | 12% | 29% | 9% | 12% |
| East Central | 32% | 13% | 26% | 14% | 14% |
| Southwest | 24% | 18% | 31% | 17% | 11% |
| South Central | 33% | 14% | 29% | 6% | 18% |
| Southeast | 30% | 17% | 41% | 6% | 6% |

**Table 48. Bridge weight restriction ratings by grain producers in CRD**

| | Not at all | | Somewhat | | Definitely |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Northwest | 34% | 13% | 28% | 11% | 14% |
| North Central | 38% | 14% | 22% | 12% | 14% |
| Northeast | 35% | 15% | 17% | 17% | 17% |
| West Central | 31% | 13% | 26% | 17% | 13% |
| Central | 35% | 15% | 25% | 10% | 16% |
| East Central | 34% | 18% | 19% | 14% | 15% |
| Southwest | 30% | 11% | 26% | 14% | 19% |
| South Central | 36% | 8% | 16% | 18% | 22% |
| Southeast | 29% | 20% | 29% | 10% | 11% |

**Table 49. Availability of seasonal labor ratings by grain producers in CRD**

| | Not at all | | Somewhat | | Definitely |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Northwest | 29% | 14% | 31% | 13% | 12% |
| North Central | 30% | 19% | 29% | 15% | 7% |
| Northeast | 40% | 13% | 29% | 14% | 5% |
| West Central | 27% | 18% | 29% | 15% | 11% |
| Central | 30% | 20% | 23% | 13% | 14% |
| East Central | 37% | 23% | 22% | 14% | 3% |
| Southwest | 28% | 9% | 29% | 16% | 19% |
| South Central | 30% | 4% | 33% | 15% | 17% |
| Southeast | 36% | 21% | 24% | 12% | 8% |

**Table 50. Lack of on-farm storage ratings by grain producers in CRD**

| | Not at all | | Somewhat | | Definitely |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Northwest | 32% | 21% | 26% | 12% | 8% |
| North Central | 31% | 18% | 33% | 12% | 6% |
| Northeast | 32% | 16% | 28% | 12% | 12% |
| West Central | 26% | 21% | 30% | 13% | 10% |
| Central | 29% | 21% | 27% | 13% | 10% |
| East Central | 25% | 20% | 34% | 15% | 6% |
| Southwest | 29% | 19% | 37% | 7% | 8% |
| South Central | 24% | 20% | 29% | 22% | 4% |
| Southeast | 26% | 25% | 19% | 18% | 12% |

**Table 51. Elevator storage capacity ratings by grain producers in CRD**

| | Not at all | | Somewhat | | Definitely |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Northwest | 43% | 25% | 20% | 8% | 3% |
| North Central | 29% | 32% | 24% | 11% | 5% |
| Northeast | 43% | 21% | 23% | 10% | 4% |
| West Central | 42% | 23% | 23% | 9% | 3% |
| Central | 43% | 24% | 14% | 12% | 6% |
| East Central | 36% | 11% | 29% | 16% | 8% |
| Southwest | 25% | 15% | 32% | 13% | 14% |
| South Central | 32% | 17% | 17% | 17% | 17% |
| Southeast | 34% | 20% | 23% | 14% | 9% |

**Table 52. Elevator unloading time ratings by grain producers in CRD**

| | Not at all | | Somewhat | | Definitely |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Northwest | 30% | 28% | 23% | 12% | 7% |
| North Central | 33% | 20% | 25% | 11% | 11% |
| Northeast | 32% | 20% | 27% | 12% | 9% |
| West Central | 33% | 23% | 29% | 8% | 7% |
| Central | 36% | 19% | 22% | 12% | 10% |
| East Central | 28% | 10% | 19% | 18% | 26% |
| Southwest | 14% | 15% | 32% | 18% | 20% |
| South Central | 23% | 9% | 21% | 21% | 26% |
| Southeast | 29% | 20% | 30% | 11% | 9% |

**Table 53. Distance to preferred market ratings by grain producers in CRD**

| | Not at all | | Somewhat | | Definitely |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Northwest | 33% | 27% | 21% | 10% | 8% |
| North Central | 34% | 27% | 21% | 11% | 6% |
| Northeast | 33% | 25% | 27% | 8% | 8% |
| West Central | 32% | 25% | 29% | 8% | 6% |
| Central | 32% | 24% | 25% | 11% | 8% |
| East Central | 31% | 22% | 32% | 11% | 5% |
| Southwest | 30% | 23% | 32% | 10% | 5% |
| South Central | 22% | 14% | 30% | 20% | 14% |
| Southeast | 27% | 28% | 34% | 11% | 1% |

**Table 54. Trucking cost ratings by grain producers in CRD**

| | Not at all | | Somewhat | | Definitely |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Northwest | 18% | 11% | 38% | 19% | 14% |
| North Central | 19% | 17% | 25% | 22% | 17% |
| Northeast | 17% | 7% | 28% | 29% | 18% |
| West Central | 13% | 13% | 31% | 24% | 19% |
| Central | 17% | 11% | 27% | 19% | 25% |
| East Central | 14% | 14% | 32% | 24% | 16% |
| Southwest | 8% | 14% | 34% | 18% | 26% |
| South Central | 19% | 6% | 26% | 23% | 26% |
| Southeast | 19% | 14% | 34% | 19% | 13% |

**Table 55. Rail service access ratings by grain producers in CRD**

| | Not at all | | Somewhat | | Definitely |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Northwest | 36% | 21% | 20% | 10% | 12% |
| North Central | 28% | 27% | 25% | 11% | 9% |
| Northeast | 27% | 11% | 27% | 14% | 22% |
| West Central | 27% | 23% | 21% | 17% | 13% |
| Central | 35% | 14% | 25% | 11% | 15% |
| East Central | 35% | 11% | 17% | 17% | 20% |
| Southwest | 29% | 14% | 25% | 14% | 18% |
| South Central | 32% | 5% | 27% | 22% | 15% |
| Southeast | 33% | 10% | 28% | 8% | 20% |

**Table 56. Rail service reliability ratings by grain producers in CRD**

| | Not at all | | Somewhat | | Definitely |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Northwest | 28.4% | 21.3% | 25.5% | 10.6% | 14.2% |
| North Central | 22.4% | 21.1% | 23.7% | 19.1% | 13.8% |
| Northeast | 25.8% | 10.1% | 31.5% | 13.5% | 19.1% |
| West Central | 23.0% | 21.4% | 23.0% | 19.8% | 12.7% |
| Central | 28.1% | 10.9% | 22.7% | 18.8% | 19.5% |
| East Central | 37.0% | 9.6% | 19.2% | 19.2% | 15.1% |
| Southwest | 18.0% | 14.8% | 27.9% | 16.4% | 23.0% |
| South Central | 26.3% | 13.2% | 23.7% | 21.1% | 15.8% |
| Southeast | 35.1% | 8.8% | 24.6% | 14.0% | 17.5% |

**Table 57. Rail service cost ratings by grain producers in CRD**

| | Not at all | | Somewhat | | Definitely |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Northwest | 24% | 11% | 26% | 15% | 24% |
| North Central | 20% | 14% | 29% | 21% | 16% |
| Northeast | 25% | 8% | 35% | 11% | 21% |
| West Central | 22% | 17% | 22% | 18% | 21% |
| Central | 28% | 10% | 17% | 18% | 27% |
| East Central | 33% | 11% | 26% | 14% | 16% |
| Southwest | 16% | 14% | 22% | 22% | 28% |
| South Central | 26% | 11% | 37% | 23% | 3% |
| Southeast | 37% | 10% | 25% | 15% | 14% |

**Table 58. Percentage of corn market for CRD elevators**

| | Northwest | North Central | Northeast | West Central | Central | East Central | Southwest | South Central | Southeast |
|---|---|---|---|---|---|---|---|---|---|
| Iowa feeders | 45.5% | 16.4% | 11.8% | 27.6% | 27.6% | 10.7% | 6.1% | 21.9% | 15.5% |
| Out-of-state feeders | 8.2% | 6.9% | 0.0% | 32.0% | 11.4% | 1.7% | 40.4% | 55.4% | 0.2% |
| Iowa ethanol plants | 32.0% | 34.5% | 14.0% | 12.4% | 30.3% | 26.6% | 17.5% | 1.6% | 11.8% |
| Out-of-state ethanol plants | 0.0% | 0.0% | 0.0% | 1.3% | 0.0% | 0.0% | 2.2% | 2.5% | 0.1% |
| Iowa processors | 3.2% | 13.8% | 50.4% | 4.9% | 11.5% | 37.3% | 4.1% | 3.9% | 39.0% |
| Out-of-state processors | 0.0% | 7.8% | 0.0% | 5.1% | 1.4% | 0.0% | 1.0% | 1.4% | 0.0% |
| Illinois River terminals | 0.0% | 0.0% | 1.0% | 0.0% | 0.0% | 0.0% | 1.9% | 0.0% | 0.0% |
| Mississippi River terminals | 0.0% | 1.3% | 12.1% | 0.0% | 0.5% | 8.3% | 0.0% | 1.0% | 24.7% |
| Missouri River terminals | 0.0% | 0.4% | 0.0% | 0.1% | 0.0% | 0.0% | 2.8% | 0.0% | 0.0% |
| Gulf Coast | 1.3% | 7.4% | 10.4% | 0.7% | 1.8% | 15.4% | 0.0% | 0.0% | 7.3% |
| West Coast | 0.5% | 0.3% | 0.0% | 0.9% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Mexico | 8.6% | 7.7% | 0.0% | 3.8% | 8.7% | 0.0% | 0.6% | 12.3% | 0.0% |
| Other exports | 0.0% | 3.6% | 0.3% | 1.6% | 1.7% | 0.0% | 0.0% | 0.0% | 0.0% |
| Other | 0.7% | 0.0% | 0.0% | 9.4% | 5.1% | 0.0% | 23.5% | 0.0% | 1.3% |

**Table 59. Share of corn shipments from CRD elevators by transportation mode**

| | Trucks | Rail | Barges |
|---|---|---|---|
| Northwest | 82% | 18% | 0% |
| North Central | 49% | 51% | 0% |
| Northeast | 76% | 9% | 15% |
| West Central | 62% | 38% | 0% |
| Central | 55% | 45% | 0% |
| East Central | 82% | 3% | 15% |
| Southwest | 33% | 67% | 0% |
| South Central | 39% | 61% | 0% |
| Southeast | 91% | 0% | 9% |

**Table 60. Percentage of soybean market for CRD elevators**

| | Northwest | North Central | Northeast | West Central | Central | East Central | Southwest | South Central | Southeast |
|---|---|---|---|---|---|---|---|---|---|
| Iowa processors | 83.0% | 73.6% | 65.1% | 86.5% | 95.5% | 28.1% | 69.0% | 83.5% | 2.9% |
| Out-of-state processors | 5.5% | 14.6% | 0.3% | 1.3% | 0.0% | 4.8% | 9.3% | 3.7% | 38.4% |
| Illinois River terminals | 0.0% | 0.2% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Mississippi River terminals | 4.0% | 4.1% | 23.4% | 0.0% | 0.3% | 18.6% | 16.2% | 3.7% | 56.1% |
| Missouri River terminals | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Other rivers | 0.0% | 0.4% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Gulf Coast | 2.3% | 4.8% | 10.7% | 0.0% | 1.5% | 48.6% | 0.0% | 0.0% | 2.5% |
| West Coast | 0.6% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Mexico | 4.6% | 0.5% | 0.0% | 6.9% | 0.0% | 0.0% | 5.4% | 9.1% | 0.0% |
| Other exports | 0.0% | 0.5% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Other | 0.0% | 1.4% | 0.5% | 5.4% | 2.8% | 0.0% | 0.0% | 0.0% | 0.0% |

**Table 61. Share of soybean shipments from CRD elevators by transportation mode**

| | Trucks | Rail | Barges |
|---|---|---|---|
| Northwest | 90% | 10% | 0% |
| North Central | 85% | 15% | 0% |
| Northeast | 81% | 4% | 15% |
| West Central | 90% | 10% | 0% |
| Central | 94% | 6% | 0% |
| East Central | 51% | 0% | 49% |
| Southwest | 71% | 29% | 0% |
| South Central | 91% | 9% | 0% |
| Southeast | 53% | 0% | 47% |

**Table 62. Estimated volume of ethanol co-products handled by CRD country elevators and distance from country elevators to the source of co-products**

| | Ethanol co-products (ton) | Average distance (mile) | Maximum distance (mile) |
|---|---|---|---|
| Northwest | 895,338 | 39.54 | 76.00 |
| North Central | 371,502 | 31.53 | 71.00 |
| Northeast | 176,010 | 52.35 | 97.00 |
| West Central | 225,965 | 49.08 | 75.08 |
| Central | 200,062 | 37.69 | 53.78 |
| East Central | 214,781 | 46.33 | 60.25 |
| Southwest | 76,790 | 69.00 | 113.33 |
| South Central | NA | NA | NA |
| Southeast | NA | NA | NA |

**Table 63. Number of feed delivery trucks by size and by CRD**

| | 2006 | | | | 2012 | | | |
|---|---|---|---|---|---|---|---|---|
| | 6-ton | 12-ton | 18-ton | 24-ton | 6-ton | 12-ton | 18-ton | 24-ton |
| Northwest | 86 | 148 | 116 | 143 | 36 | 129 | 124 | 241 |
| North Central | 44 | 19 | 50 | 126 | 17 | 22 | 47 | 156 |
| Northeast | 64 | 69 | 61 | 53 | 45 | 61 | 53 | 56 |
| West Central | 69 | 39 | 41 | 55 | 47 | 36 | 33 | 74 |
| Central | 22 | 33 | 56 | 71 | 17 | 38 | 24 | 47 |
| East Central | 17 | 19 | 50 | 125 | 11 | 11 | 41 | 81 |
| Southwest | 20 | - | 8 | 6 | 17 | - | 8 | 11 |
| South Central | 25 | 22 | 14 | 17 | 28 | 19 | 22 | 31 |
| Southeast | 45 | 22 | 17 | 38 | 47 | 19 | 19 | 55 |

**Table 64. Number of feed delivery trucks by size and by CRD**

| | Truck Weight | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 6-ton | | 12-ton | | 18-ton | | 24-ton | |
| | Avg. | Max. | Avg. | Max. | Avg. | Max. | Avg. | Max. |
| Northwest | 18.0 | 35.7 | 17.9 | 43.8 | 21.3 | 45.2 | 38.3 | 77.8 |
| North Central | 10.4 | 31.7 | 17.2 | 41.8 | 25.4 | 50.6 | 25.8 | 68.1 |
| Northeast | 10.2 | 25.8 | 15.0 | 37.8 | 17.9 | 50.0 | 20.1 | 59.1 |
| West Central | 14.0 | 41.3 | 14.1 | 40.0 | 23.9 | 67.5 | 34.5 | 63.5 |
| Central | 19.5 | 37.5 | 19.3 | 44.6 | 44.0 | 86.7 | 60.4 | 140.7 |
| East Central | 15.0 | 29.7 | 16.0 | 49.2 | 15.1 | 39.6 | 30.1 | 95.5 |
| Southwest | 19.0 | 37.5 | 20.0 | 60.0 | 15.0 | 65.0 | 50.0 | 350.0 |
| South Central | 17.0 | 35.0 | 17.3 | 40.0 | 20.0 | 50.0 | 30.0 | 120.0 |
| Southeast | 10.0 | 34.4 | 14.3 | 45.0 | 25.0 | 64.3 | 19.3 | 54.0 |

**Table 65. Rail line ratings by country elevators in CRD**

| | Poor | | Average | | Excellent |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Northwest | 18% | 0% | 71% | 11% | 0% |
| North Central | 6% | 29% | 54% | 11% | 0% |
| Northeast | 0% | 28% | 52% | 20% | 0% |
| West Central | 0% | 11% | 83% | 6% | 0% |
| Central | 8% | 16% | 60% | 16% | 0% |
| East Central | 13% | 6% | 50% | 31% | 0% |
| Southwest | 8% | 0% | 58% | 33% | 0% |
| South Central | 17% | 17% | 67% | 0% | 0% |
| Southeast | 0% | 67% | 33% | 0% | 0% |

**Table 66. Interstate ratings by country elevators in CRD**

| | Poor | | Average | | Excellent |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Northwest | 2% | 2% | 51% | 39% | 5% |
| North Central | 0% | 0% | 56% | 36% | 8% |
| Northeast | 0% | 3% | 56% | 33% | 8% |
| West Central | 0% | 3% | 47% | 47% | 3% |
| Central | 0% | 2% | 33% | 59% | 7% |
| East Central | 0% | 0% | 38% | 54% | 8% |
| Southwest | 6% | 6% | 39% | 44% | 6% |
| South Central | 8% | 8% | 54% | 15% | 15% |
| Southeast | 0% | 0% | 42% | 53% | 5% |

**Table 67. Primary state highway ratings by country elevators in CRD**

| | Poor | | Average | | Excellent |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Northwest | 2% | 9% | 50% | 36% | 2% |
| North Central | 0% | 18% | 53% | 25% | 5% |
| Northeast | 0% | 28% | 50% | 23% | 0% |
| West Central | 9% | 18% | 38% | 15% | 21% |
| Central | 2% | 17% | 35% | 28% | 17% |
| East Central | 0% | 17% | 57% | 24% | 2% |
| Southwest | 6% | 11% | 67% | 17% | 0% |
| South Central | 8% | 8% | 54% | 31% | 0% |
| Southeast | 0% | 9% | 61% | 30% | 0% |

**Table 68. Paved county road ratings by country elevators in CRD**

| | Poor | | Average | | Excellent |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Northwest | 2% | 22% | 36% | 36% | 4% |
| North Central | 5% | 23% | 43% | 25% | 5% |
| Northeast | 10% | 34% | 49% | 7% | 0% |
| West Central | 3% | 24% | 35% | 38% | 0% |
| Central | 7% | 11% | 57% | 24% | 2% |
| East Central | 0% | 28% | 50% | 20% | 3% |
| Southwest | 11% | 17% | 56% | 17% | 0% |
| South Central | 0% | 15% | 38% | 46% | 0% |
| Southeast | 5% | 27% | 45% | 23% | 0% |

**Table 69. Unimproved gravel road ratings by country elevators in CRD**

| | Poor | | Average | | Excellent |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Northwest | 11% | 14% | 55% | 18% | 2% |
| North Central | 8% | 13% | 55% | 25% | 0% |
| Northeast | 12% | 46% | 39% | 2% | 0% |
| West Central | 12% | 18% | 58% | 12% | 0% |
| Central | 7% | 36% | 50% | 5% | 2% |
| East Central | 10% | 40% | 38% | 13% | 0% |
| Southwest | 17% | 28% | 50% | 6% | 0% |
| South Central | 8% | 23% | 46% | 23% | 0% |
| Southeast | 19% | 19% | 48% | 14% | 0% |

**Table 70. Waterway ratings by country elevators in CRD**

| | Poor | | Average | | Excellent |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Northwest | 0% | 5% | 84% | 11% | 0% |
| North Central | 0% | 25% | 55% | 20% | 0% |
| Northeast | 7% | 18% | 61% | 14% | 0% |
| West Central | 8% | 15% | 62% | 15% | 0% |
| Central | 6% | 13% | 69% | 13% | 0% |
| East Central | 0% | 19% | 57% | 19% | 5% |
| Southwest | 14% | 0% | 86% | 0% | 0% |
| South Central | 0% | 25% | 75% | 0% | 0% |
| Southeast | 0% | 10% | 50% | 40% | 0% |

**Table 71. Road weight restriction ratings by country elevators in CRD**

| | Not at all | | Somewhat | | Definitely |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Northwest | 21% | 19% | 40% | 10% | 10% |
| North Central | 28% | 35% | 25% | 3% | 10% |
| Northeast | 17% | 22% | 29% | 12% | 20% |
| West Central | 13% | 47% | 28% | 6% | 6% |
| Central | 17% | 37% | 26% | 11% | 9% |
| East Central | 37% | 17% | 32% | 7% | 7% |
| Southwest | 24% | 24% | 35% | 0% | 18% |
| South Central | 14% | 29% | 29% | 7% | 21% |
| Southeast | 30% | 13% | 35% | 13% | 9% |

**Table 72. Bridge weight restriction ratings by country elevators in CRD**

| | Not at all | | Somewhat | | Definitely |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Northwest | 17% | 17% | 37% | 15% | 15% |
| North Central | 26% | 26% | 28% | 3% | 18% |
| Northeast | 21% | 10% | 26% | 24% | 19% |
| West Central | 7% | 27% | 40% | 17% | 10% |
| Central | 19% | 21% | 33% | 21% | 7% |
| East Central | 24% | 15% | 39% | 12% | 10% |
| Southwest | 13% | 25% | 31% | 13% | 19% |
| South Central | 15% | 38% | 31% | 8% | 8% |
| Southeast | 26% | 17% | 17% | 26% | 13% |

**Table 73. Availability of seasonal labor ratings by country elevators in CRD**

| | Not at all | | Somewhat | | Definitely |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Northwest | 5% | 16% | 20% | 23% | 36% |
| North Central | 7% | 15% | 29% | 17% | 32% |
| Northeast | 10% | 13% | 30% | 25% | 23% |
| West Central | 3% | 6% | 26% | 16% | 48% |
| Central | 7% | 9% | 18% | 31% | 36% |
| East Central | 20% | 8% | 33% | 20% | 20% |
| Southwest | 19% | 19% | 31% | 25% | 6% |
| South Central | 15% | 15% | 15% | 38% | 15% |
| Southeast | 22% | 22% | 39% | 9% | 9% |

**Table 74. Facility storage capacity ratings by country elevators in CRD**

| | Not at all | | Somewhat | | Definitely |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Northwest | 7% | 12% | 40% | 19% | 23% |
| North Central | 12% | 20% | 22% | 29% | 17% |
| Northeast | 10% | 13% | 38% | 18% | 23% |
| West Central | 0% | 10% | 42% | 35% | 13% |
| Central | 13% | 7% | 31% | 24% | 24% |
| East Central | 5% | 8% | 16% | 45% | 26% |
| Southwest | 6% | 12% | 29% | 18% | 35% |
| South Central | 8% | 38% | 31% | 0% | 23% |
| Southeast | 9% | 9% | 48% | 13% | 22% |

**Table 75. Facility unloading time ratings by country elevators in CRD**

| | Not at all | | Somewhat | | Definitely |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Northwest | 19% | 23% | 28% | 14% | 16% |
| North Central | 27% | 24% | 17% | 17% | 15% |
| Northeast | 10% | 40% | 33% | 8% | 10% |
| West Central | 3% | 48% | 19% | 16% | 13% |
| Central | 17% | 30% | 26% | 15% | 11% |
| East Central | 13% | 21% | 21% | 26% | 21% |
| Southwest | 18% | 6% | 35% | 35% | 6% |
| South Central | 8% | 38% | 31% | 0% | 23% |
| Southeast | 26% | 22% | 26% | 13% | 13% |

**Table 76. Trucking cost ratings by country elevators in CRD**

| | Not at all | | Somewhat | | Definitely |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Northwest | 5% | 9% | 34% | 27% | 25% |
| North Central | 0% | 17% | 17% | 46% | 20% |
| Northeast | 2% | 12% | 17% | 27% | 41% |
| West Central | 3% | 6% | 44% | 19% | 28% |
| Central | 4% | 9% | 24% | 31% | 31% |
| East Central | 10% | 20% | 15% | 24% | 32% |
| Southwest | 0% | 12% | 29% | 29% | 29% |
| South Central | 0% | 7% | 21% | 43% | 29% |
| Southeast | 9% | 9% | 26% | 22% | 35% |

**Table 77. Rail service access ratings by country elevators in CRD**

| | Not at all | | Somewhat | | Definitely |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Northwest | 36% | 24% | 18% | 3% | 18% |
| North Central | 34% | 25% | 13% | 13% | 16% |
| Northeast | 21% | 25% | 17% | 8% | 29% |
| West Central | 9% | 50% | 23% | 5% | 14% |
| Central | 29% | 32% | 15% | 12% | 12% |
| East Central | 29% | 17% | 33% | 4% | 17% |
| Southwest | 9% | 36% | 27% | 9% | 18% |
| South Central | 30% | 10% | 20% | 0% | 40% |
| Southeast | 67% | 11% | 11% | 0% | 11% |

**Table 78. Rail service reliability ratings by country elevators in CRD**

| | Not at all | | Somewhat | | Definitely |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Northwest | 26% | 23% | 26% | 10% | 16% |
| North Central | 10% | 13% | 33% | 10% | 33% |
| Northeast | 19% | 38% | 0% | 13% | 31% |
| West Central | 11% | 11% | 21% | 47% | 11% |
| Central | 22% | 7% | 37% | 30% | 4% |
| East Central | 33% | 13% | 40% | 0% | 13% |
| Southwest | 9% | 0% | 36% | 9% | 45% |
| South Central | 50% | 0% | 13% | 25% | 13% |
| Southeast | 86% | 0% | 14% | 0% | 0% |

**Table 79. Rail service cost ratings by country elevators in CRD**

| | Not at all | | Somewhat | | Definitely |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Northwest | 23% | 16% | 19% | 16% | 26% |
| North Central | 13% | 17% | 13% | 20% | 37% |
| Northeast | 29% | 24% | 29% | 6% | 12% |
| West Central | 12% | 6% | 24% | 18% | 41% |
| Central | 22% | 7% | 11% | 22% | 37% |
| East Central | 33% | 7% | 33% | 7% | 20% |
| Southwest | 9% | 0% | 36% | 27% | 27% |
| South Central | 50% | 13% | 0% | 13% | 25% |
| Southeast | 86% | 0% | 14% | 0% | 0% |

**Table 80. Barge service access ratings by country elevators in CRD**

| | Not at all | | Somewhat | | Definitely |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Northwest | 71% | 18% | 6% | 6% | 0% |
| North Central | 50% | 22% | 11% | 11% | 6% |
| Northeast | 30% | 27% | 23% | 17% | 3% |
| West Central | 73% | 0% | 0% | 9% | 18% |
| Central | 90% | 0% | 0% | 5% | 5% |
| East Central | 41% | 12% | 35% | 6% | 6% |
| Southwest | 43% | 43% | 0% | 0% | 14% |
| South Central | 60% | 20% | 0% | 0% | 20% |
| Southeast | 62% | 15% | 23% | 0% | 0% |

**Table 81. Barge service reliability ratings by country elevators in CRD**

| | Not at all | | Somewhat | | Definitely |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Northwest | 69% | 19% | 6% | 6% | 0% |
| North Central | 44% | 28% | 17% | 11% | 0% |
| Northeast | 31% | 31% | 19% | 15% | 4% |
| West Central | 89% | 0% | 0% | 0% | 11% |
| Central | 89% | 0% | 0% | 5% | 5% |
| East Central | 47% | 7% | 40% | 7% | 0% |
| Southwest | 50% | 33% | 17% | 0% | 0% |
| South Central | 60% | 20% | 0% | 0% | 20% |
| Southeast | 42% | 17% | 33% | 8% | 0% |

**Table 82. Barge service cost ratings by country elevators in CRD**

| | Not at all | | Somewhat | | Definitely |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Northwest | 69% | 19% | 6% | 0% | 6% |
| North Central | 47% | 12% | 12% | 24% | 6% |
| Northeast | 21% | 16% | 16% | 32% | 16% |
| West Central | 11% | 0% | 78% | 0% | 11% |
| Central | 53% | 0% | 37% | 5% | 5% |
| East Central | 47% | 7% | 20% | 13% | 13% |
| Southwest | 50% | 33% | 0% | 17% | 0% |
| South Central | 60% | 20% | 0% | 0% | 20% |
| Southeast | 42% | 17% | 17% | 17% | 8% |

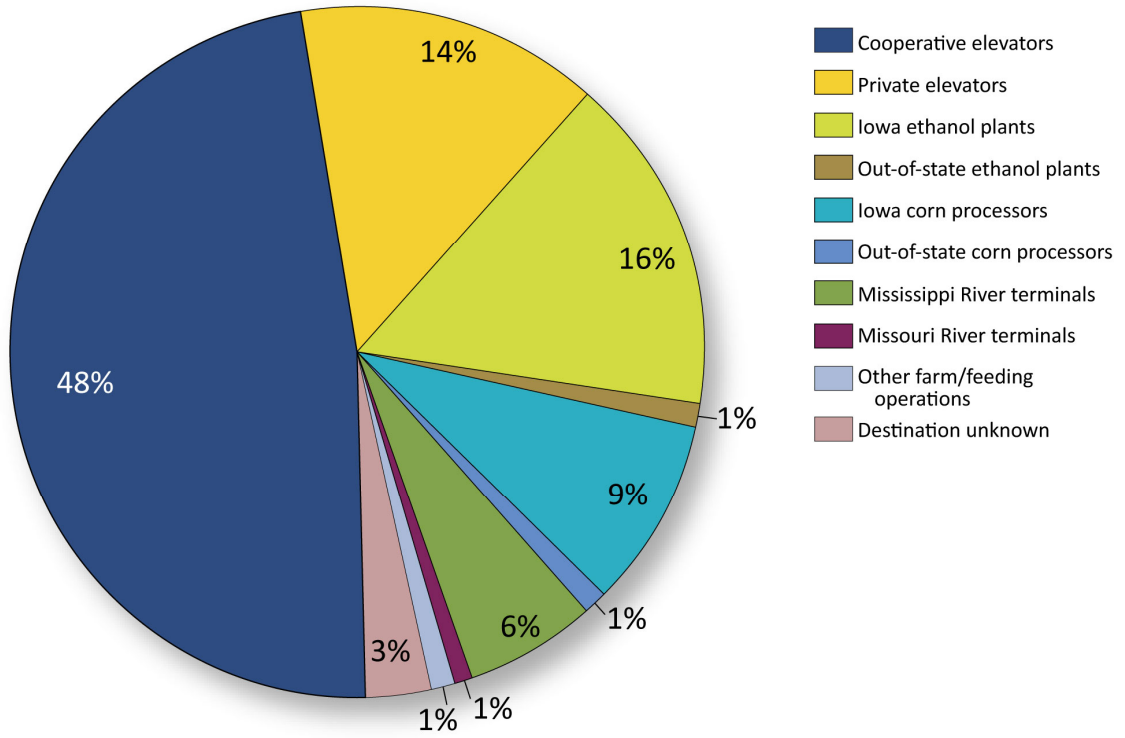



**Figure 1. Markets for Iowa corn producers**

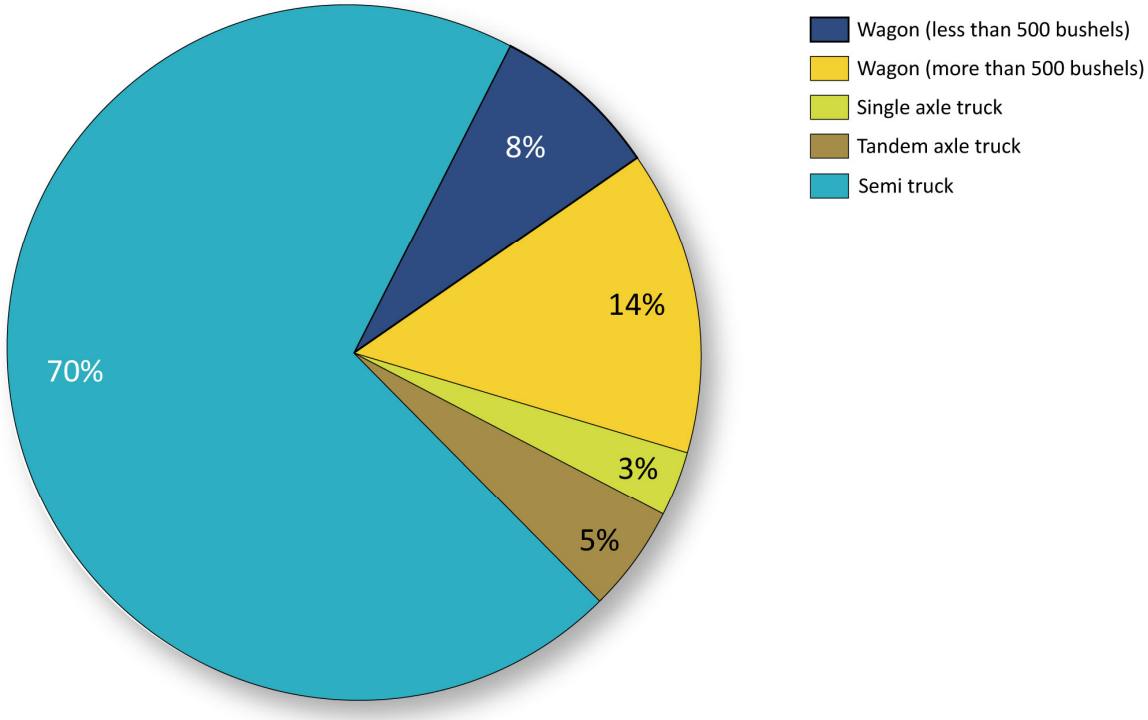



**Figure 2. Modes of transportation for Iowa corn utilized by producers**

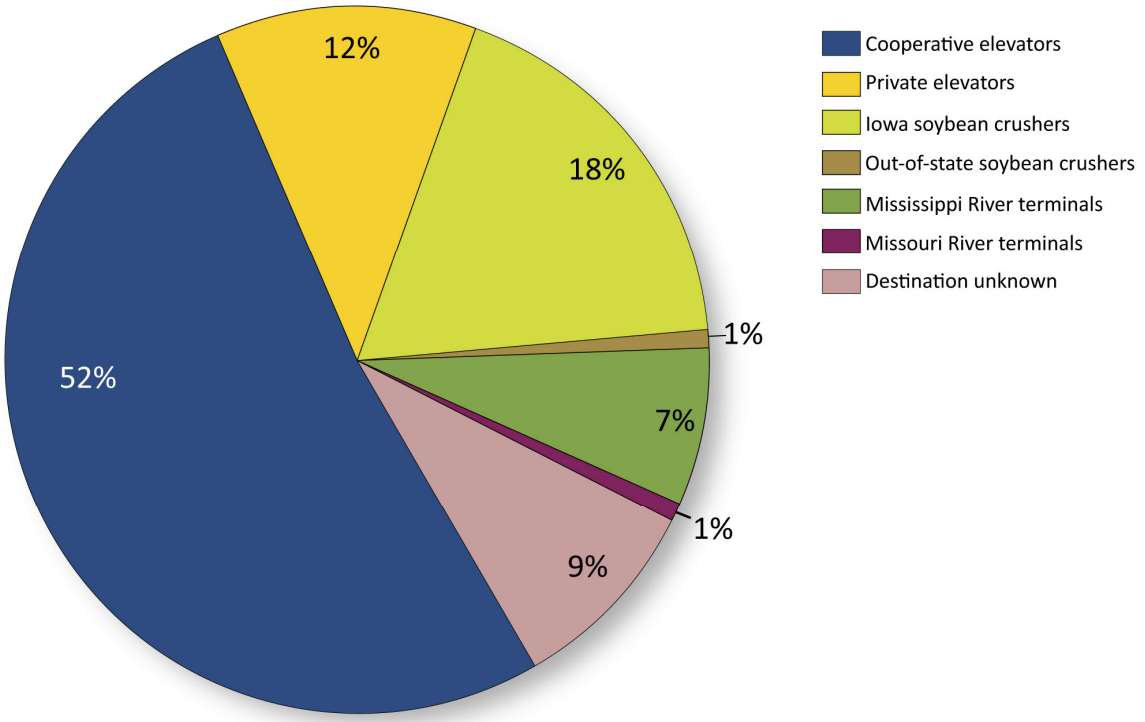



**Figure 3. Markets for Iowa soybean producers**

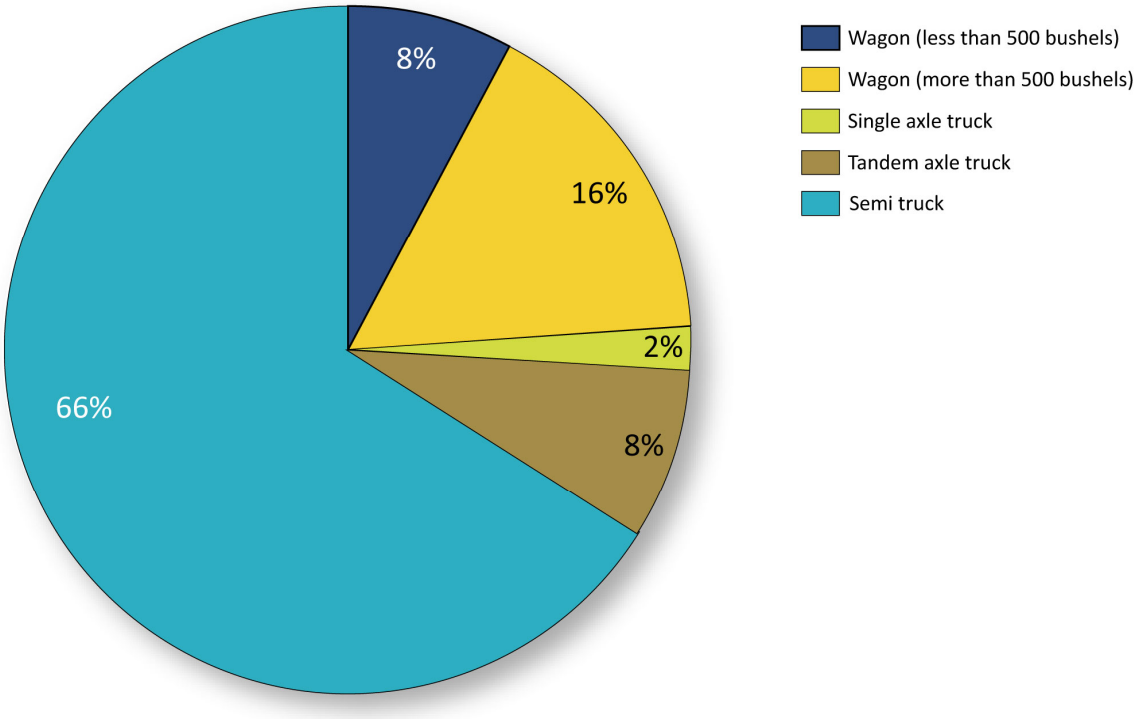



**Figure 4. Modes of transportation for Iowa soybeans utilized by producers**

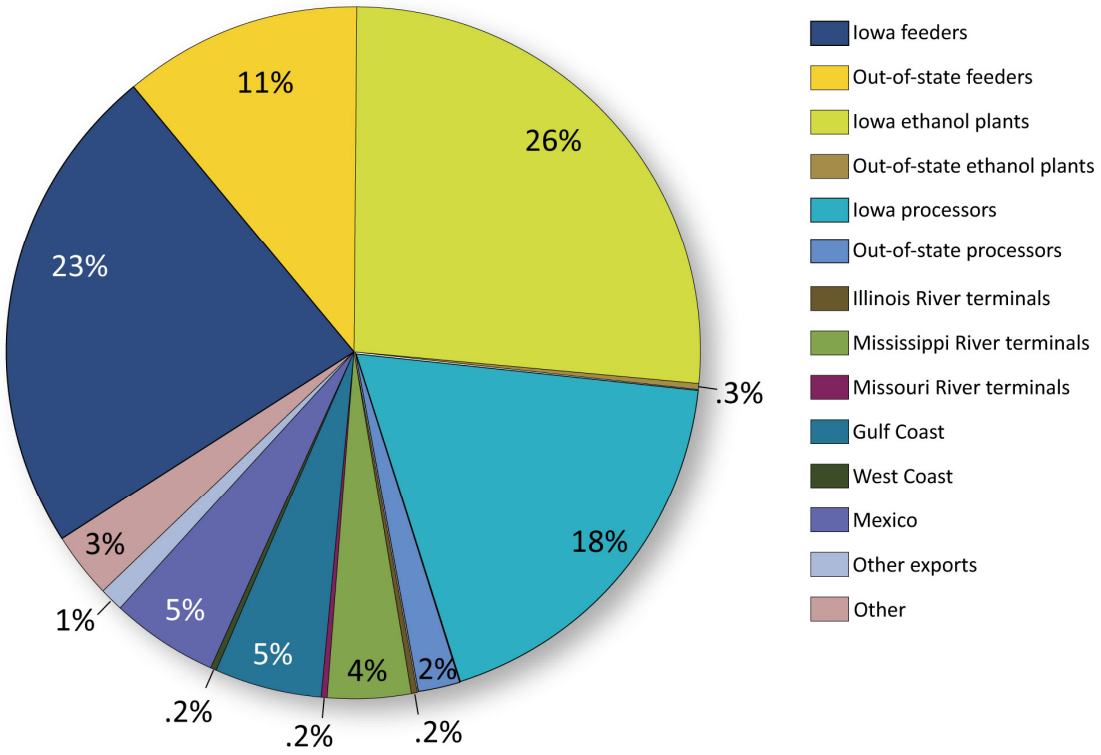



**Figure 5. Markets for Iowa corn from country elevators**

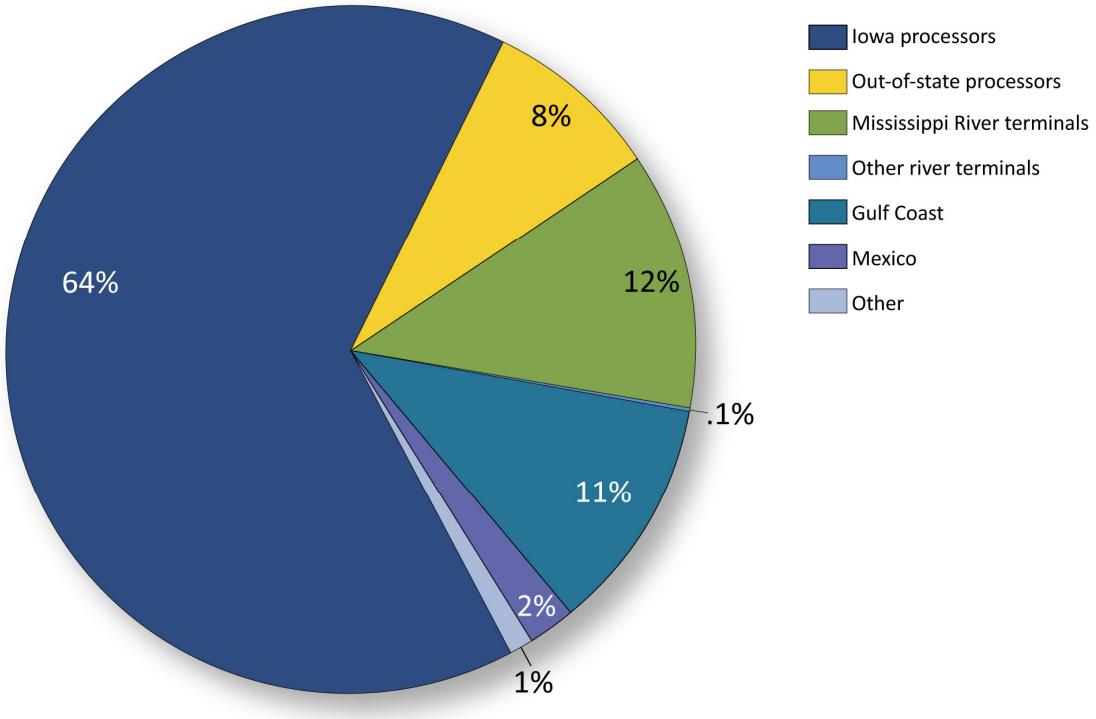



**Figure 6. Markets for Iowa soybeans from country elevators**

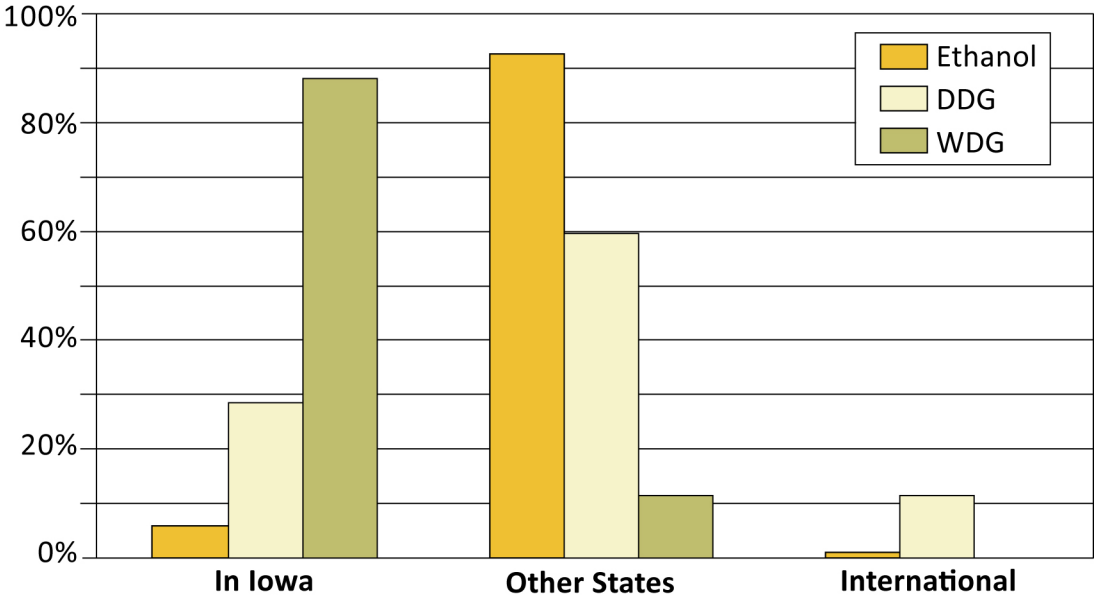
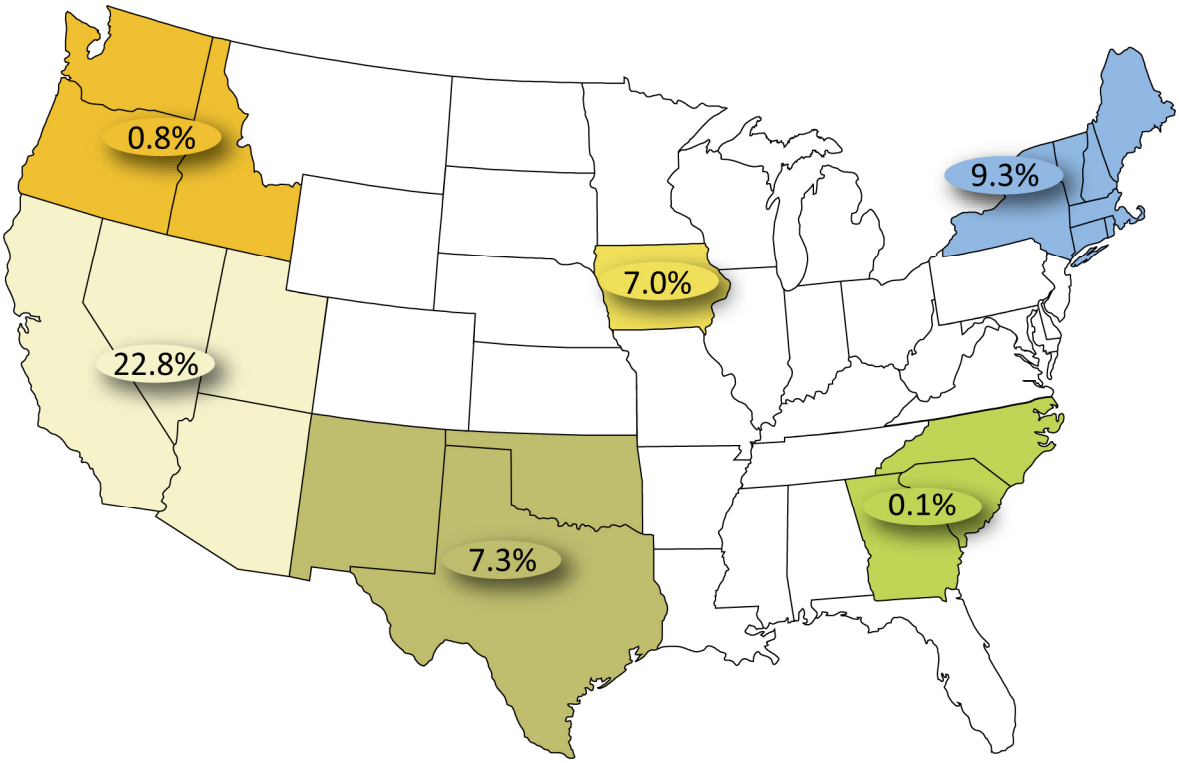
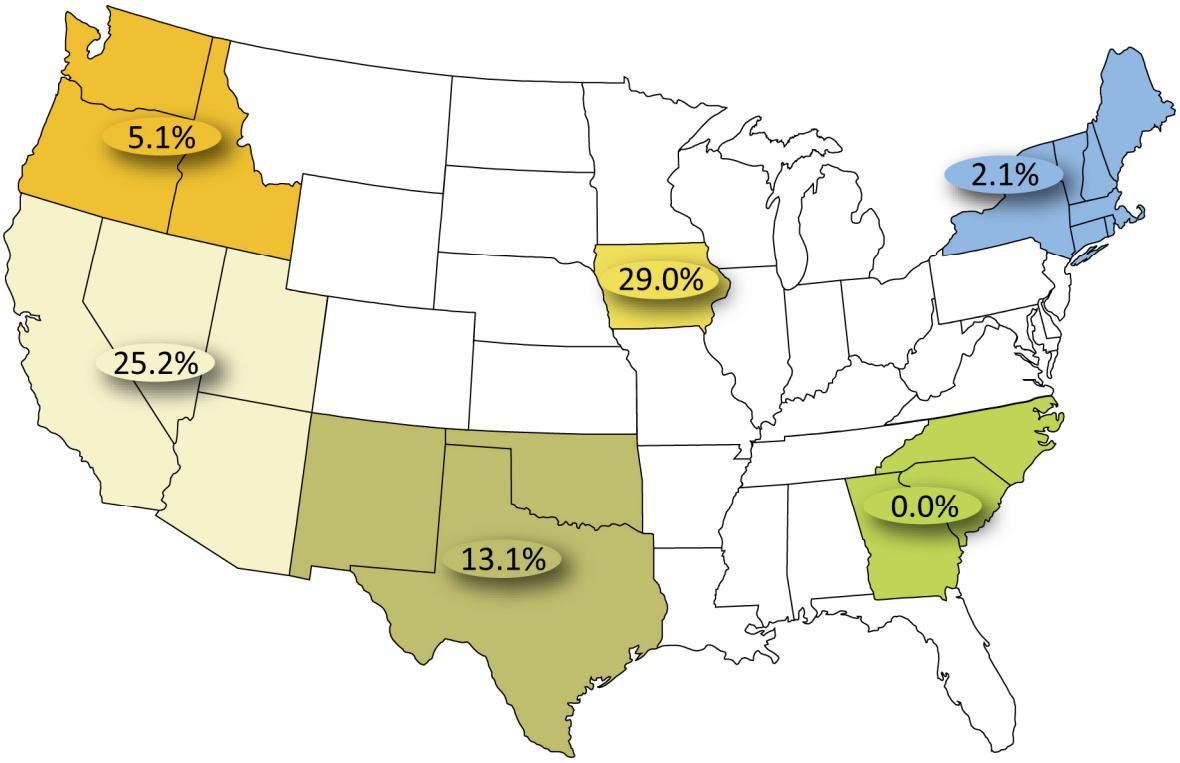



**Figure 7. Markets for Iowa ethanol, DDG, and WDG from corn processors**



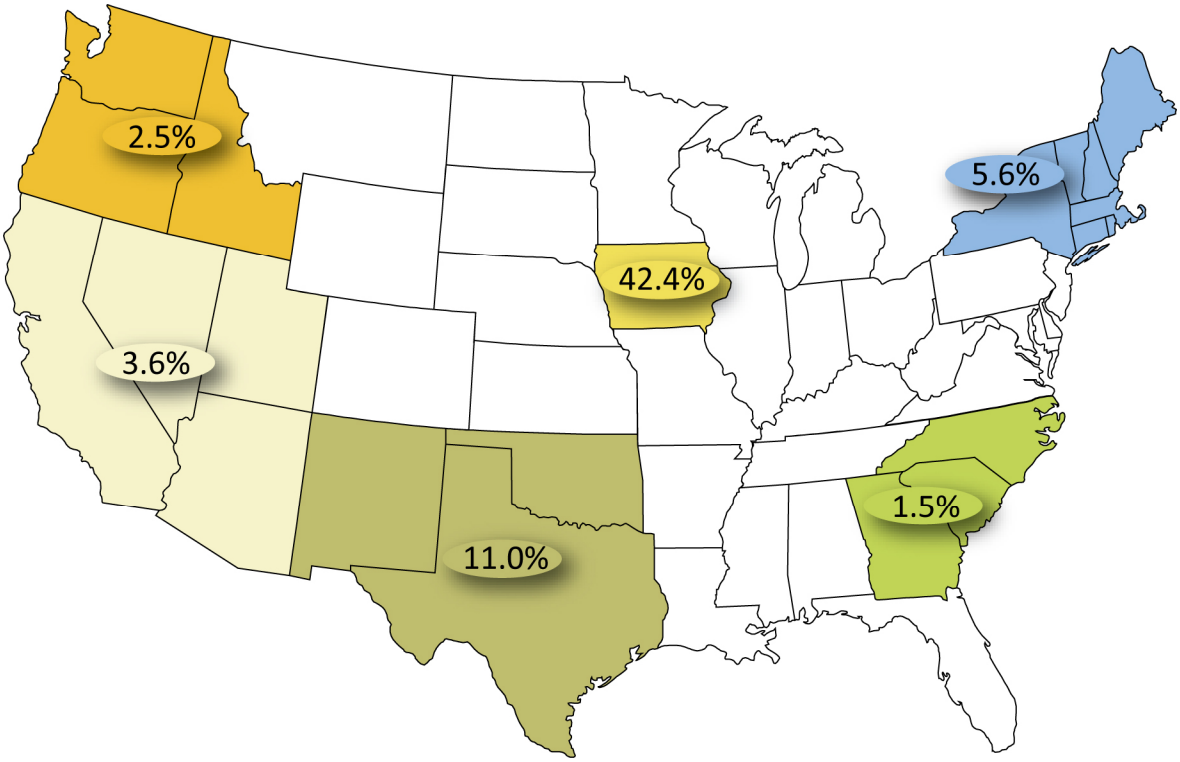

Note: Percentage sold to other states and countries = 52%

**Figure 8. Percentage of Iowa ethanol sold**




Note: Percentage sold to other states and countries = 25.5%

**Figure 9. Percentage of Iowa DDG sold**




Note: Percentage sold to other states and countries = 33.3%

**Figure 10. Percentage of Iowa soybean meal destination market**

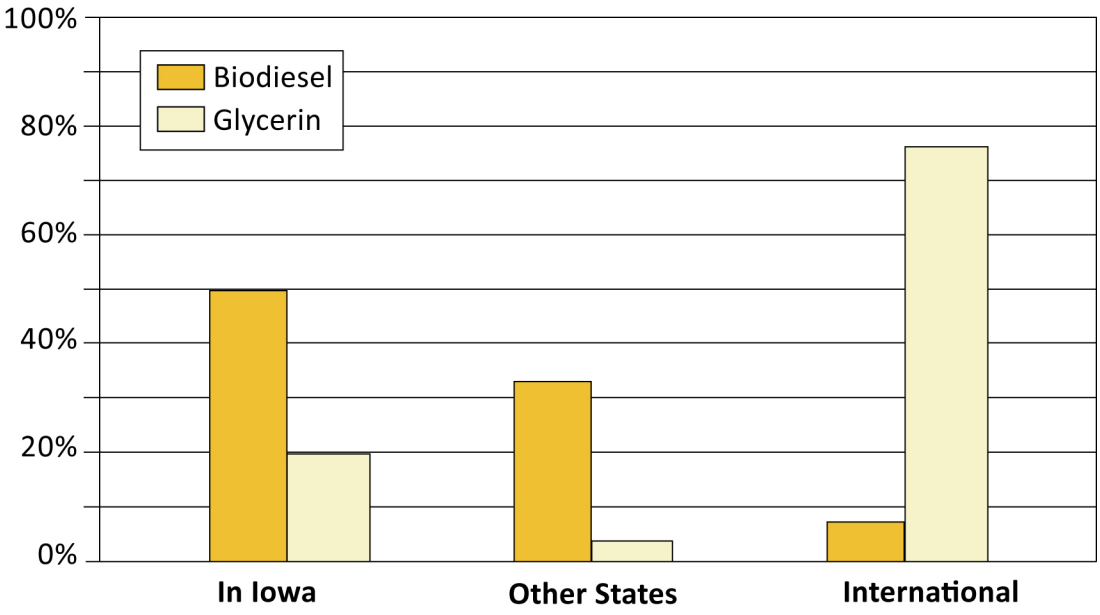
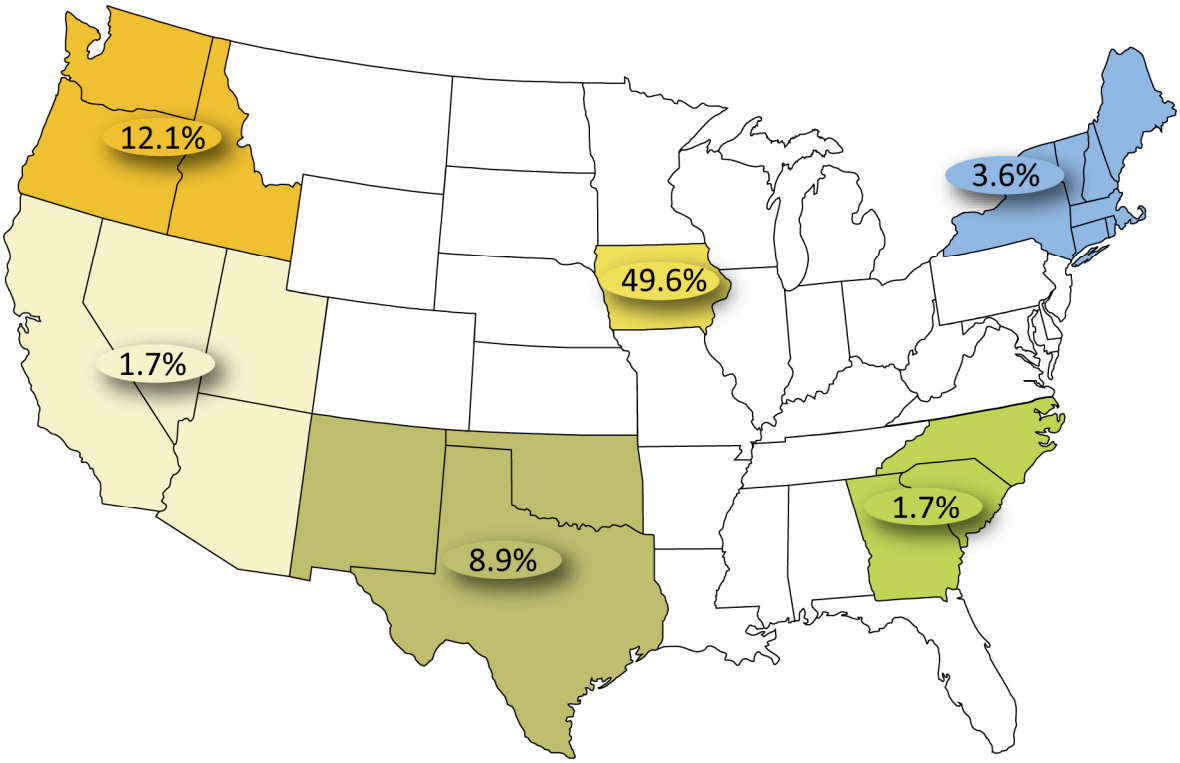
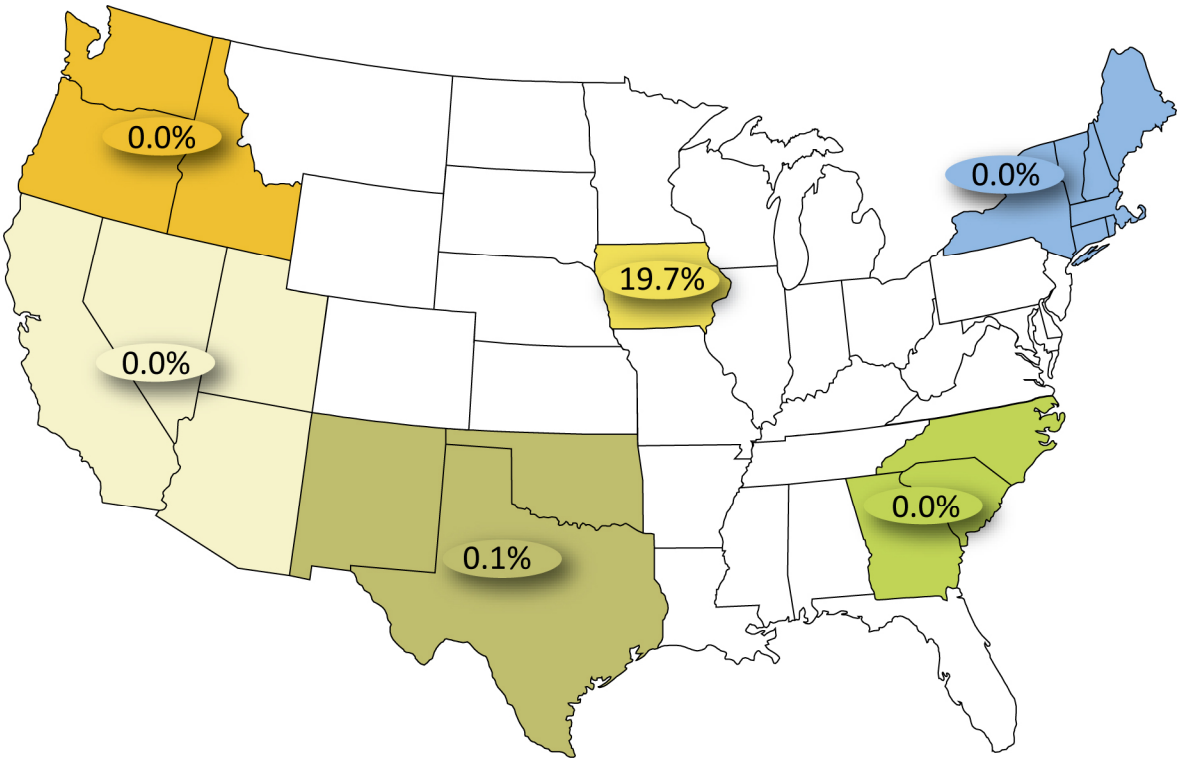



**Figure 11. Markets for Iowa biodiesel and glycerin**




Note: Percentage sold to other states and countries = 22.5%

**Figure 12. Percentage of Iowa biodiesel sales at destination market**




Note: Percentage sold to other states and countries = 81.2%

**Figure 13. Percentage of Iowa glycerin sales at destination market**

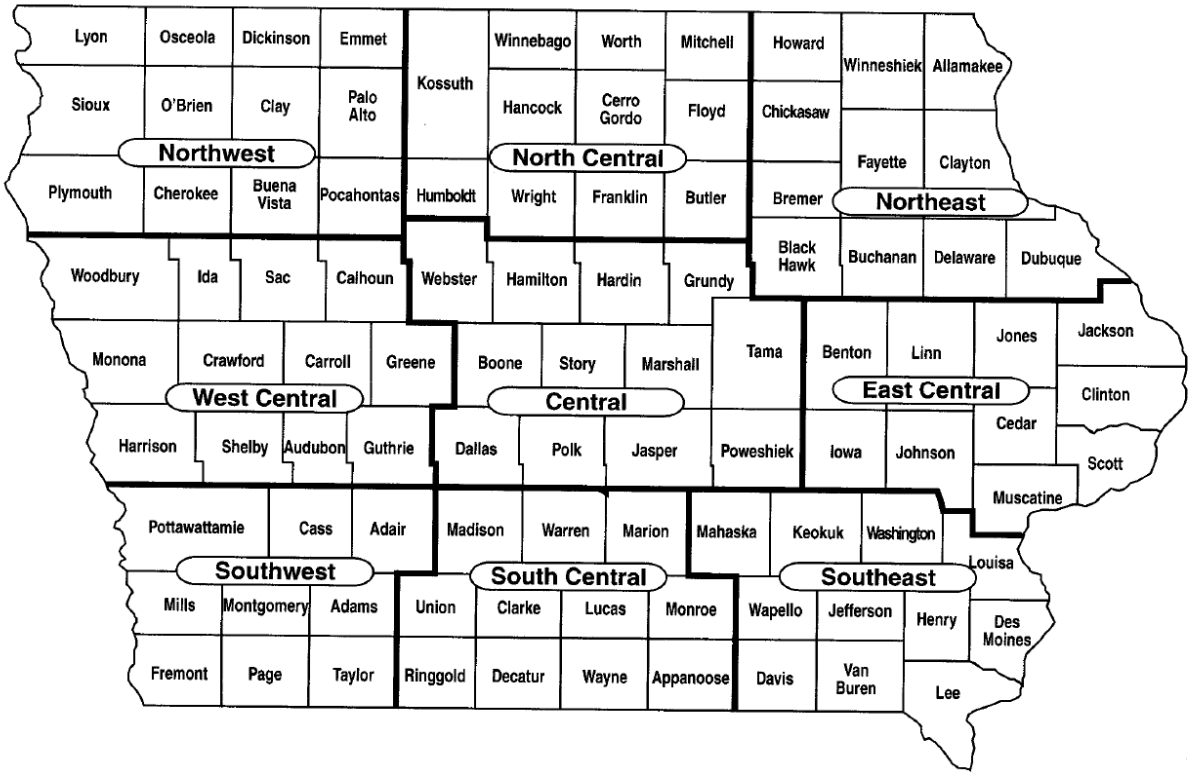



**Figure 14. Iowa's crop reporting districts**

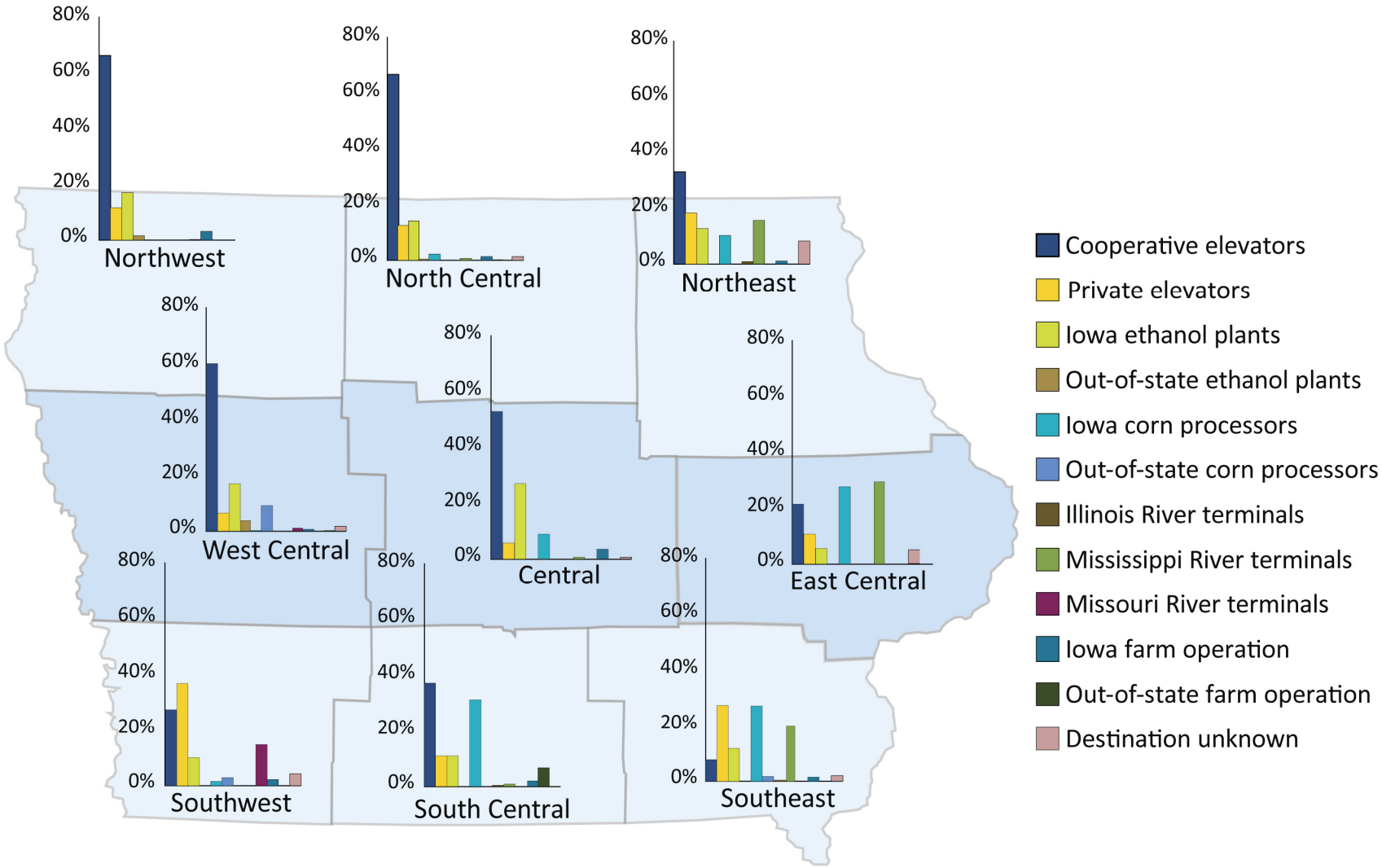



**Figure 15. Percentage of market for CRD corn producers**

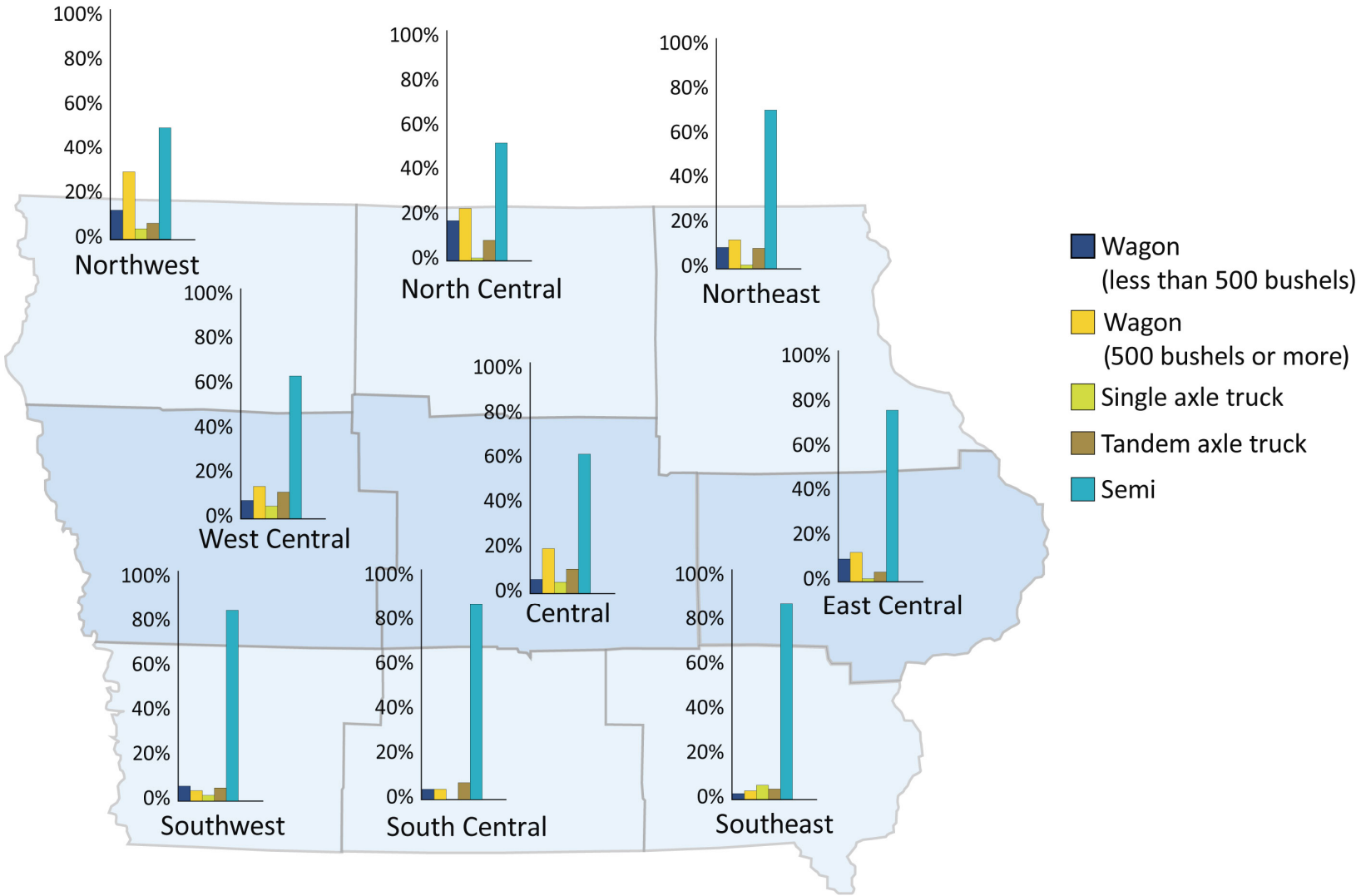



**Figure 16. Corn shipments from CRD farms to markets by type of vehicle**

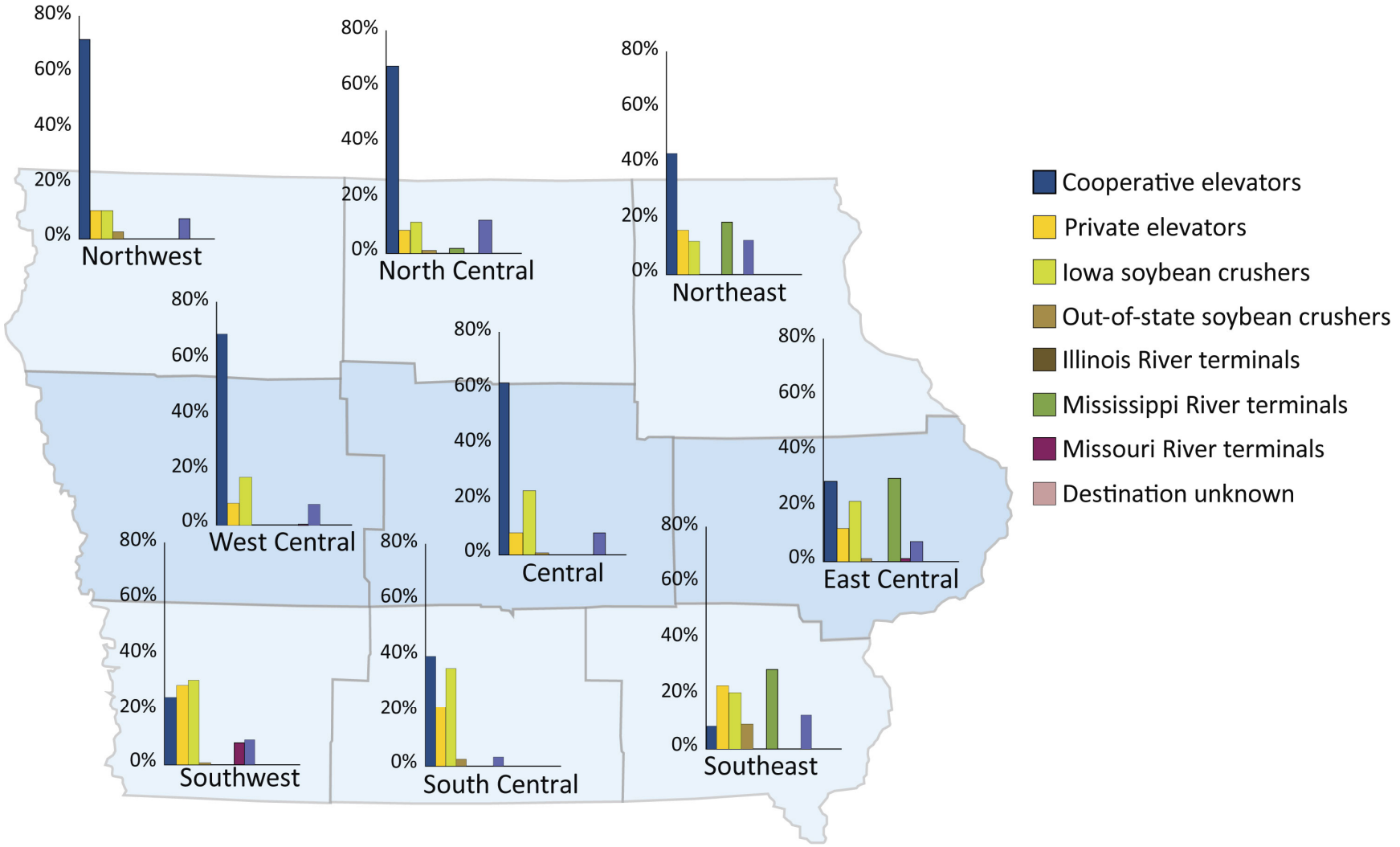



**Figure 17. Percentage of market for CRD soybean producers**

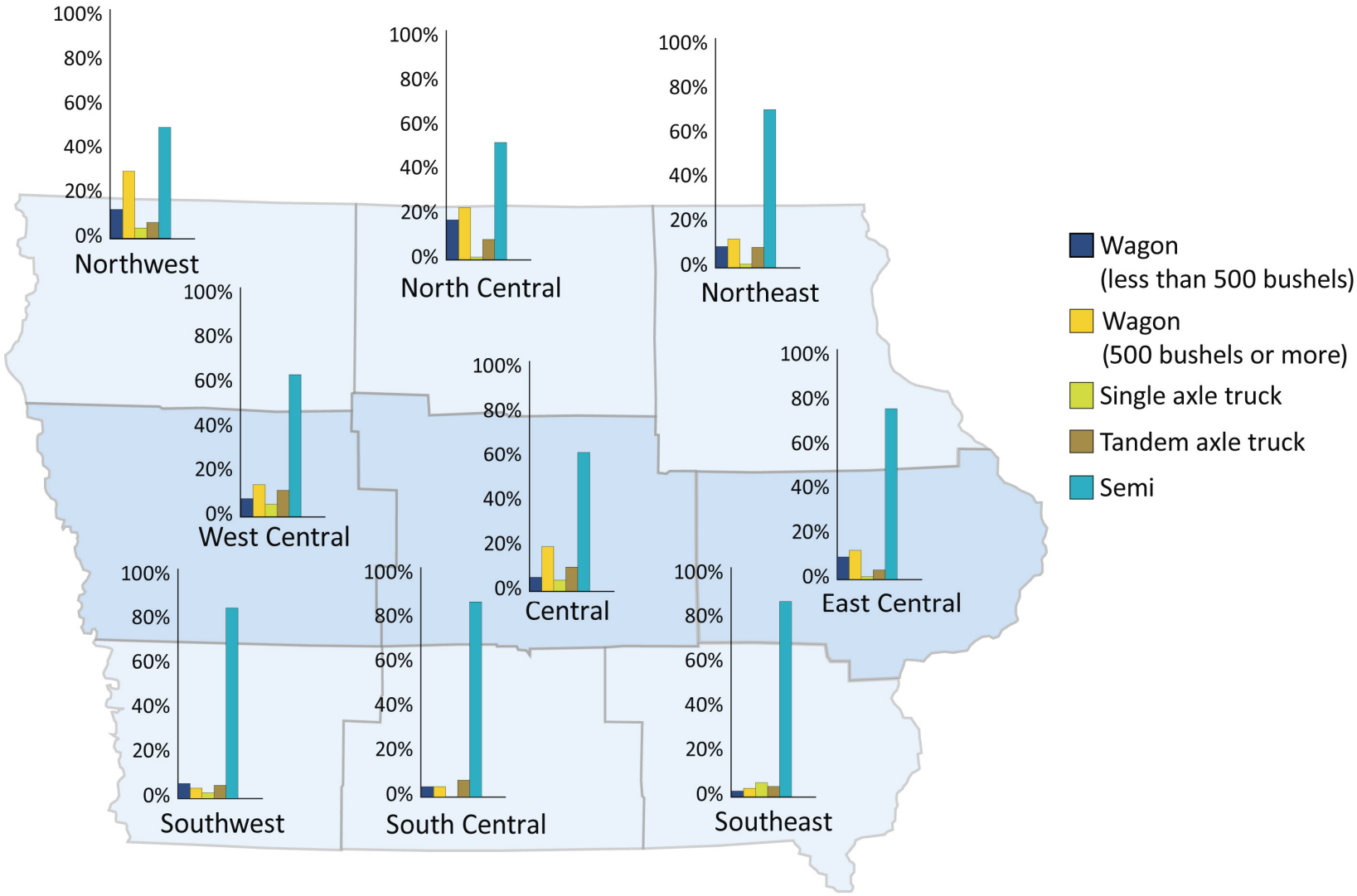



**Figure 18. Soybean shipments from CRD farms to markets by type of vehicle**

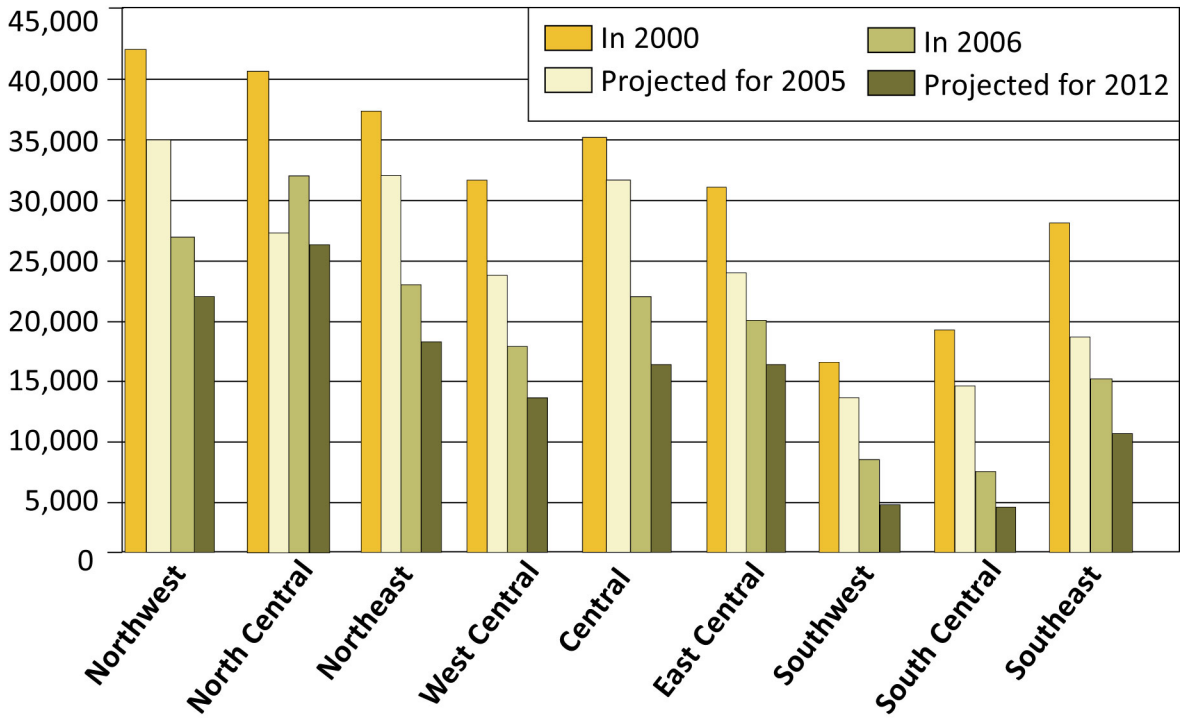



**Figure 19. Comparing vehicle numbers by CRD**

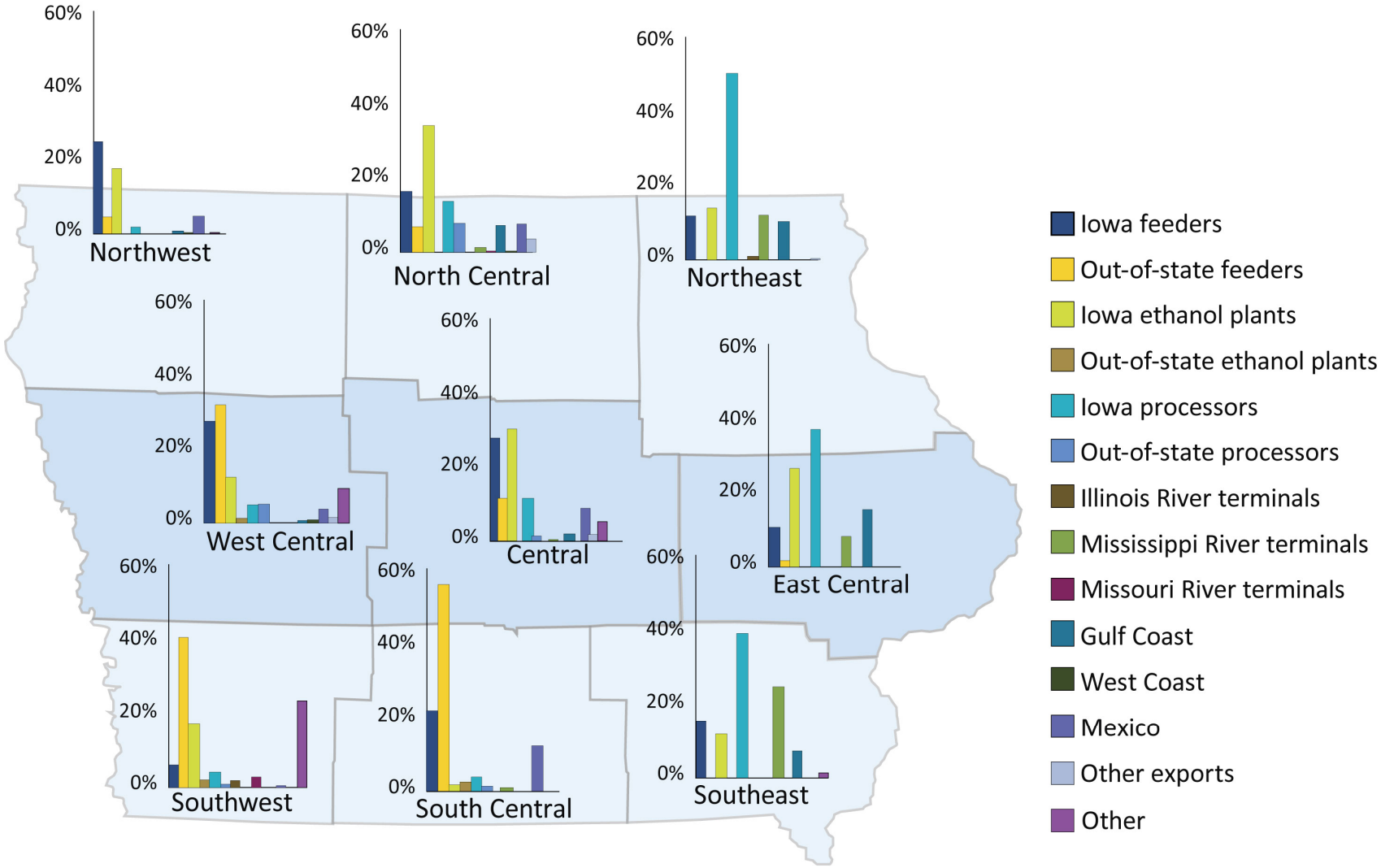



**Figure 20. Percentage of corn market for CRD elevators**

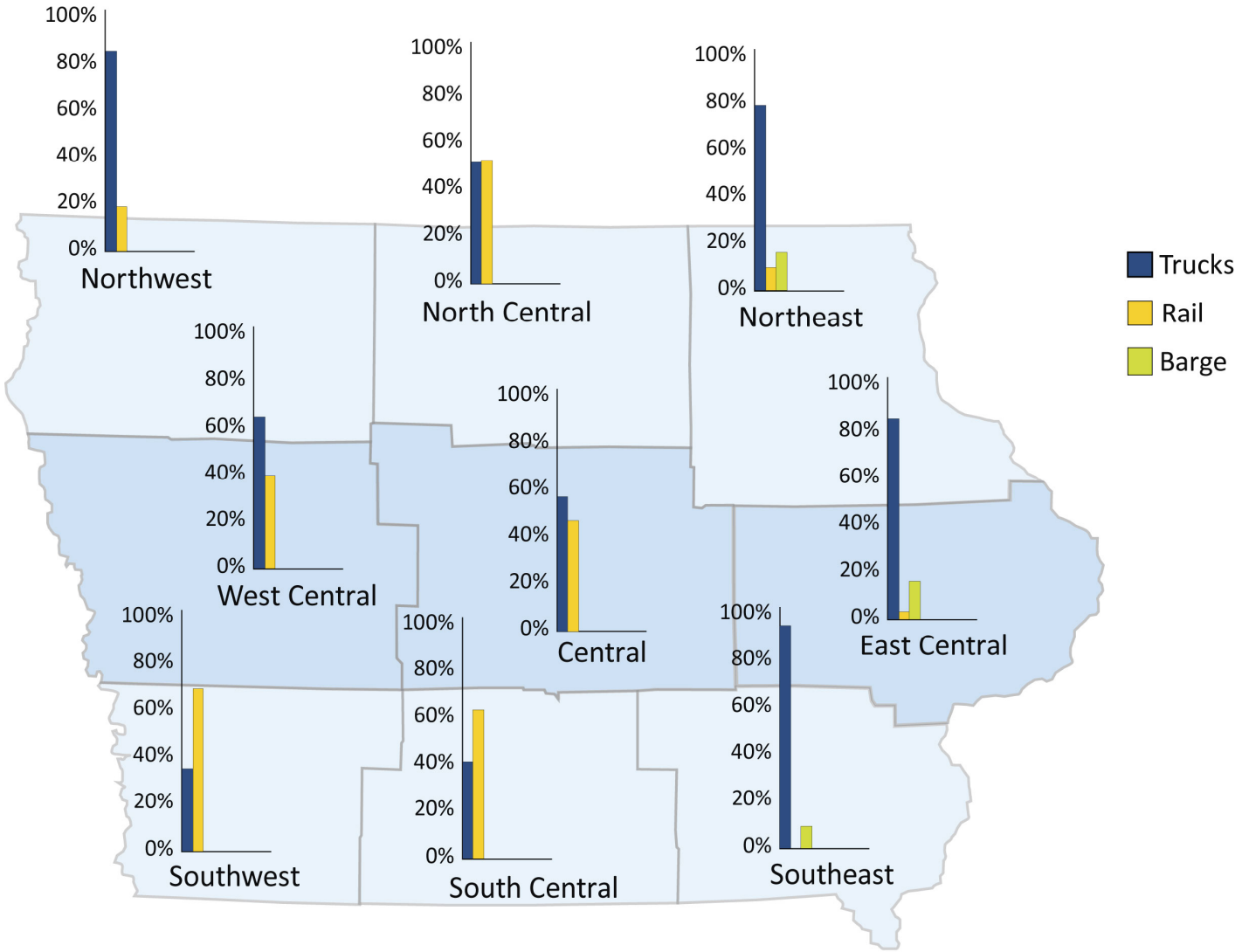



**Figure 21. Share of corn shipments from CRD elevators by transportation mode**

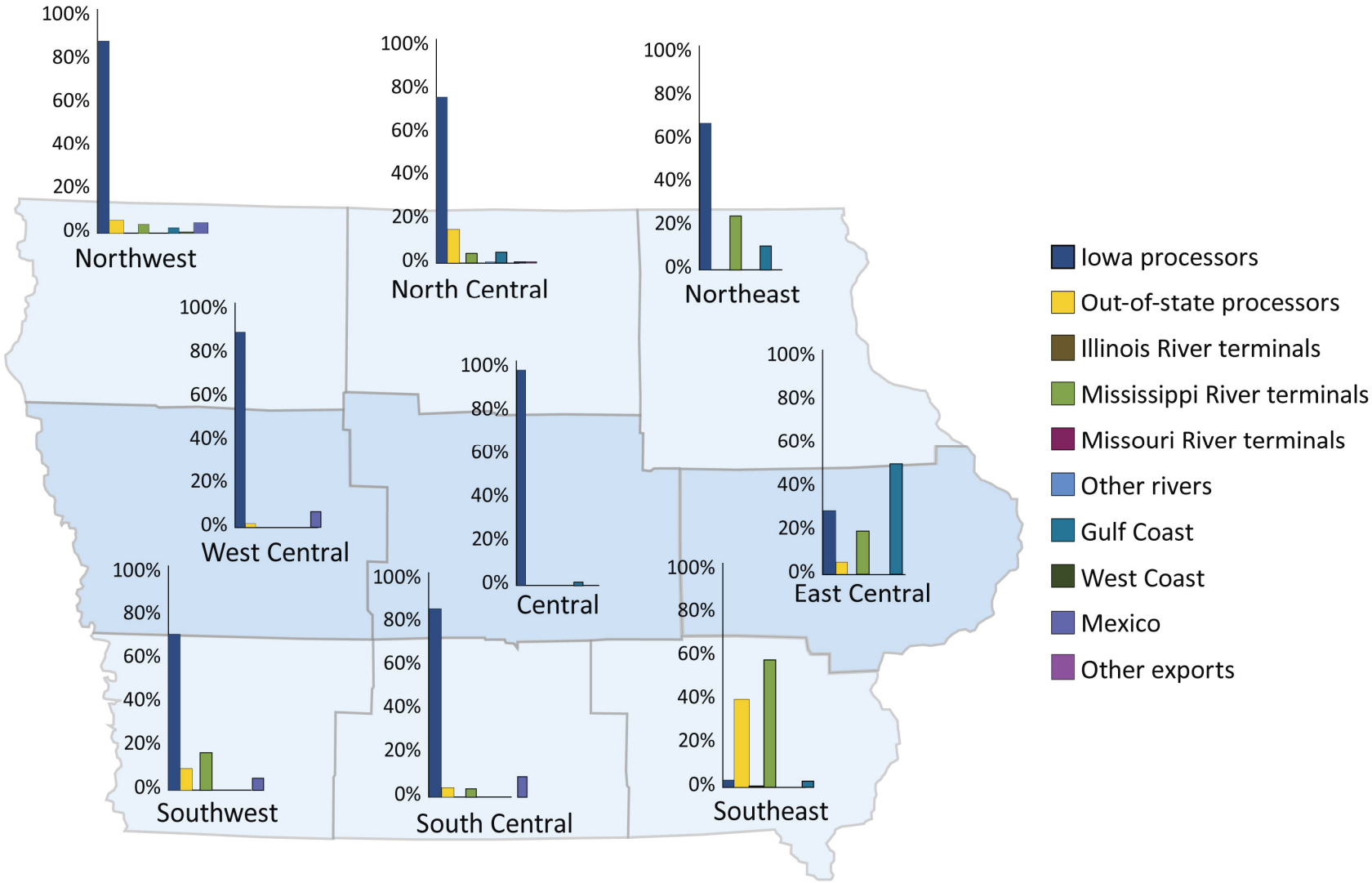



**Figure 22. Percentage of soybean market for CRD elevators**

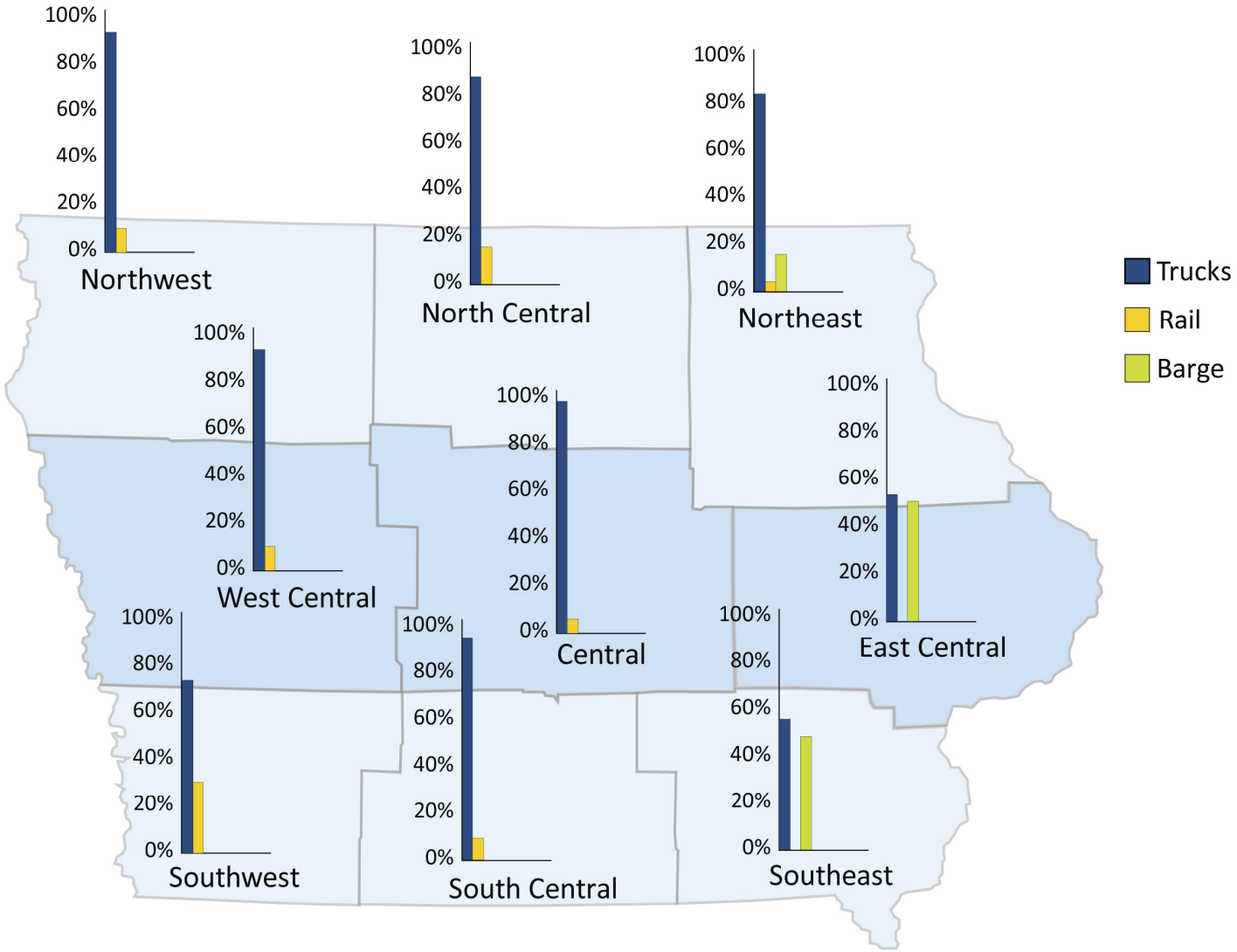



**Figure 23. Share of soybean shipments from CRD elevators by transportation mode**

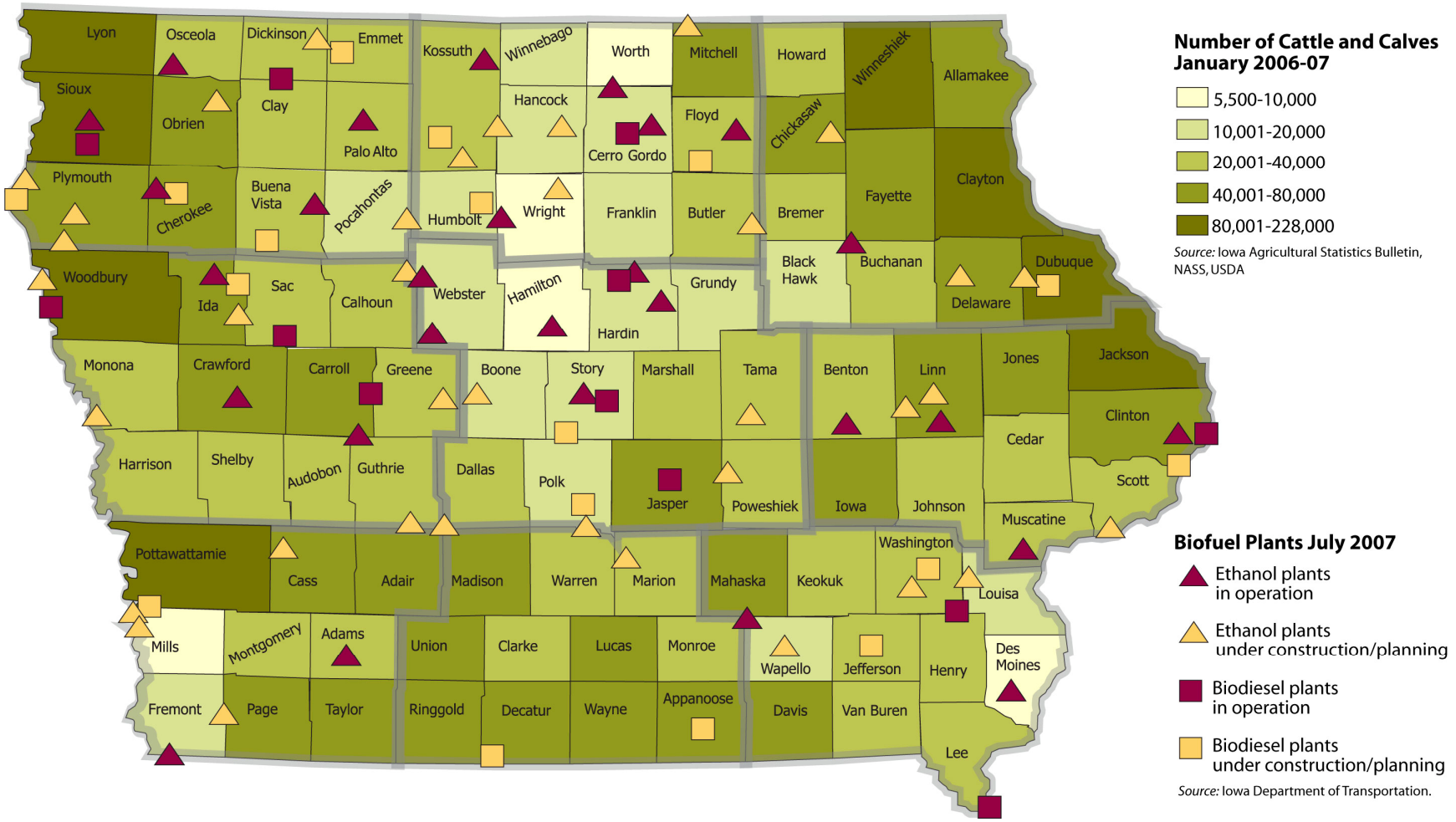



**Figure 24. Number of cattle and calves by county and location of biofuel plants in Iowa**

## Appendices

A. Iowa grain marketing survey questionnaire
B. Iowa grain handlers marketing survey questionnaire
C. Iowa corn processors marketing survey questionnaire
D. Iowa soybean processors marketing survey questionnaire
E. Iowa biodiesel producers marketing survey questionnaire
F. Population estimation methodology

## Appendix A. Iowa Grain Marketers Survey

# Iowa Grain Marketing Survey

**Date**

1. How many bushels of corn were produced on this farm in **2006** ..... bu.

*If you had no corn produced, please skip to question 5.*

2. How many acres of corn were planted on this farm in **2006** ..... ac.

3. How much of the **2006** corn crop was:

a) sold ..... bu.

b) used or to be used on this farm ..... bu.

c) not sold, but is expected to be sold ..... bu.

Total *(should equal answer in question 1)* ..... = bu.

4. Of the **2006** corn crop sold (question 3a), what was the destination from your farm and mode of transportation?

| | *Wagon-Less than 500 Bu.* | *Wagon- 500 Bu.or more* | *Single axle truck* | *Tandem axle truck* | *Semi* |
|---|---|---|---|---|---|
| a) Country elevator | - - - - - - - - - - - - - - - *(Report in Bushels)* - - - - - - - - - - - - - - - | | | | |
| 1) Cooperative elevators | | | | | |
| 2) Private elevators | | | | | |
| b) Dedicated ethanol facility | | | | | |
| 1) In Iowa | | | | | |
| 2) Out of state | | | | | |
| c) Corn millers/processors | | | | | |
| 1) In Iowa | | | | | |
| 2) Out of state | | | | | |
| d) River terminals | | | | | |
| 1) Illinois River | | | | | |
| 2) Mississippi River | | | | | |
| 3) Missouri River | | | | | |
| e) Another farm/feeding operation | | | | | |
| 1) In Iowa | | | | | |
| 2) Out of state | | | | | |
| f) Picked up from this farm, destination unknown | | | | | |
| g) Other (specify) _____ | | | | | |

5. How many bushels of soybeans were produced on this farm in **2006**? ..... bu.

*If you had no soybeans produced, please skip to question 9.*

6. How many acres of soybeans were planted on this farm in **2006**? ..... ac.

7. How much of the **2006** soybean crop was:

| | |
|---|---|
| a) sold ..... | bu. |
| b) used or to be used on this farm ..... | bu. |
| c) not sold, but is expected to be sold ..... | bu. |
| Total *(should equal answer in question 5)* ..... = | bu. |

8. Of the **2006** soybeans sold, what was the destination from your farm and mode of transportation?

| | *Wagon-Less than 500 bu.* | *Wagon- 500 bu.or more* | *Single axle truck* | *Tandem axle truck* | *Semi* |
|---|---|---|---|---|---|
| | *(Report in Bushels)* | | | | |
| a) Country elevator | | | | | |
| 1) Cooperative elevators ..... | | | | | |
| 2) Private elevators..... | | | | | |
| b) Soybean crusher | | | | | |
| 1) In Iowa ..... | | | | | |
| 2) Out of state ..... | | | | | |
| c) River terminals | | | | | |
| 1) Illinois River ..... | | | | | |
| 2) Mississippi River ..... | | | | | |
| 3) Missouri River..... | | | | | |
| d) Picked up from this farm, destination unknown ..... | | | | | |
| e) Other (specify) _____ | | | | | |

9. What type and how many grain hauling vehicles do you currently own and expect to own by the year 2012?

| | *Current number* | *Projected for 2012* |
|---|---|---|
| a) Gravity flow wagons, less than 500 bushel capacity..... | | |
| b) Gravity flow wagons, 500 or more bushel capacity ..... | | |
| c) Single axle truck..... | | |
| d) Tandem axle truck..... | | |
| d) Semi..... | | |
| e) Other ..... | | |

10. What is the average and the maximum distance you will move grain, for any reason, with the grain hauling equipment you have on your operation?

| | | *Corn* | *Soybean* |
|---|---|---|---|
| a) Gravity flow wagon, less than 500 bu..... | *Average one-way miles* | | |
| | *Maximum one-way miles* | | |
| b) Gravity flow wagon, 500 bu or more..... | *Average one-way miles* | | |
| | *Maximum one-way miles* | | |
| c) Single axle truck ..... | *Average one-way miles* | | |
| | *Maximum one-way miles* | | |
| d) Tandem axle truck ..... | *Average one-way miles* | | |
| | *Maximum one-way miles* | | |
| e) Semi ..... | *Average one-way miles* | | |
| | *Maximum one-way miles* | | |
| f) Other ..... | *Average one-way miles* | | |
| | *Maximum one-way miles* | | |

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

| | *Unimproved gravel road Miles one-way* | *Paved county road Miles one-way* | *State highway Miles one-way* |
|---|---|---|---|
| a) Corn ..... | | | |
| b) Soybean ..... | | | |

12. Was any of the corn or soybeans containerized by you before being shipped from your farm? ..... ☐ yes ☐ no, *go to question 14*

13. How many bushels of corn or soybeans from your 2006 crop were containerized by you before being shipped from your farm?

| | |
|---|---|
| a) Corn ..... | bu. |
| b) Soybeans ..... | bu. |

14. How much storage capacity do you have on-farm and how much do you plan to have by 2012?

| | *Current number* | *Projected for 2012* |
|---|---|---|
| a) Corn ..... | bu. | bu. |
| b) Soybeans ..... | bu. | bu. |

15. Do you currently have the means to segregate grains by specific traits? ..... ☐ yes ☐ no

16. Do you expect to have means to segregate grains by specific traits by 2012? ..... ☐ yes ☐ no

17. How would you rate Iowa's freight infrastructure? *Circle one answer in each row.*

| | *Poor* | | *Average* | | *Excellent* | *N/A* |
|---|---|---|---|---|---|---|
| a. Rail lines | 1 | 2 | 3 | 4 | 5 | N/A |
| b. Roadways | | | | | | |
| 1. Interstates | 1 | 2 | 3 | 4 | 5 | N/A |
| 2. Primary state highways | 1 | 2 | 3 | 4 | 5 | N/A |
| 3. Paved county roads | 1 | 2 | 3 | 4 | 5 | N/A |
| 4. Unimproved gravel roads | 1 | 2 | 3 | 4 | 5 | N/A |
| c. Waterways | 1 | 2 | 3 | 4 | 5 | N/A |

18. Do you consider the following items to be a hindrance to more efficient marketing? *Circle one answer in each row.*

| | *Not at all* | | *Some what* | | *Definitely* | *N/A* |
|---|---|---|---|---|---|---|
| a. Size of my grain hauling equipment | 1 | 2 | 3 | 4 | 5 | N/A |
| b. Road weight restrictions en route to point(s) of sale | 1 | 2 | 3 | 4 | 5 | N/A |
| c. Bridge weight restrictions en route to point(s) of sale | 1 | 2 | 3 | 4 | 5 | N/A |
| d. Availability of seasonal labor (drivers, etc.) | 1 | 2 | 3 | 4 | 5 | N/A |
| e. Lack of on-farm storage | 1 | 2 | 3 | 4 | 5 | N/A |
| f. Storage capacity at my local elevator | 1 | 2 | 3 | 4 | 5 | N/A |
| g. Unloading times at my local elevator | 1 | 2 | 3 | 4 | 5 | N/A |
| h. Distance to my preferred market(s) | 1 | 2 | 3 | 4 | 5 | N/A |
| i. Trucking costs | 1 | 2 | 3 | 4 | 5 | N/A |
| j. Access to rail service | 1 | 2 | 3 | 4 | 5 | N/A |
| k. Rail service reliability | 1 | 2 | 3 | 4 | 5 | N/A |
| l. Rail service costs | 1 | 2 | 3 | 4 | 5 | N/A |
| o. Other (please specify) _____ | 1 | 2 | 3 | 4 | 5 | N/A |

19. Comments

_____

_____

Respondent _____

Phone _____Date _____

Email (*please print)*_____

*Thank you for your time and cooperation.*

## Appendix B. Iowa Grain Handlers Survey

### Iowa Grain Handlers Marketing Survey

**Date**

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

☐ Country elevator ☐ Barge terminal ☐ Terminal elevator

☐ Grain dealer with no licensed warehouse storage capacity ☐ Other *(specify)* _____

2. What was the volume of grain movement to and from your facility for the **2006** market year of September 1, 2006 through August 31, 2007?

| | Bushels received/purchased | | Bushels shipped/processed | |
|---|---|---|---|---|
| | Corn | Soybeans | Corn | Soybeans |
| Total 2006 Marketing Year | | | | |

3. What was the volume of ethanol co-products (such as such as dried or wet distillers grains, corn gluten feed or meal, brewers grains, condensed distillers solubles, etc.) handled, brokered, mixed, or processed from September 1, 2006 through August 31, 2007?

| Volume of co-products handled (tons) | Average one-way miles from source of co-products | Maximum one-way miles from source of co-products |
|---|---|---|
| | | |

*If your firm does not operate feed delivery trucks, skip to question 7.*

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

| | 6 Ton | 12 Ton | 18 Ton | 24 Ton |
|---|---|---|---|---|
| a. Number of feed delivery trucks at this time ..... | | | | |
| b. Number of feed delivery trucks you anticipate having by 2012 ..... | | | | |

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 | Maximum one-way miles | Average one-way miles | Maximum one-way miles | Average one-way miles | Maximum one-way miles | Average one-way miles | Maximum one-way miles |
| | | | | | | | |

6. Of your firm's rail shipments, what is the typical number of rail cars per shipment? *Please check one category in each row.*

| | Number of rail cars | | | | |
|---|---|---|---|---|---|
| | 1 – 24 | 25 – 49 | 50 – 74 | 75 – 99 | 100+ |
| Corn..... | | | | | |
| Soybeans..... | | | | | |

*If you had no corn sales, skip to question 8.*

7. What were your **corn** 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.

**CORN SALES from September 1, 2006 through August 31, 2007**

| Market | Percent of volume | Percent shipped by | | | | Average distance by | | |
|---|---|---|---|---|---|---|---|---|
| | | Truck | Rail | Barge | Total | Truck | Rail | Barge |
| | | | | | | *- - - - one-way miles - - - -* | | |
| **a. As livestock feed** | | | | | | | | |
| 1. In Iowa | % | % | % | % | 100% | | | |
| 2. Out of state | % | % | % | % | 100% | | | |
| **b. Dedicated ethanol plants** | | | | | | | | |
| 1. In Iowa | % | % | % | % | 100% | | | |
| 2. Out of state | % | % | % | % | 100% | | | |
| **c. Millers/processors** | | | | | | | | |
| 1. In Iowa | % | % | % | % | 100% | | | |
| 2. Out of state | % | % | % | % | 100% | | | |
| **d. River terminals** | | | | | | | | |
| 1. Illinois River | % | % | % | % | 100% | | | |
| 2. Mississippi River | % | % | % | % | 100% | | | |
| 3. Missouri River | % | % | % | % | 100% | | | |
| **e. Direct to export markets** | | | | | | | | |
| 1. Gulf Coast | % | % | % | % | 100% | | | |
| 2. West Coast | % | % | % | % | 100% | | | |
| 3. Mexico | % | % | % | % | 100% | | | |
| 4. Other | % | % | % | % | 100% | | | |
| **f. Other** | % | % | % | % | 100% | | | |
| Total | 100% | | | | | | | |

*If you had no soybean sales, skip to question 9.*

8. What were your **soybean** 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.

**SOYBEAN SALES from September 1, 2006 through August 31, 2007**

| Market | Percent of volume | Percent shipped by | | | | Average distance by | | |
|---|---|---|---|---|---|---|---|---|
| | | Truck | Rail | Barge | Total | Truck | Rail | Barge |
| | | | | | | *- - - - one-way miles - - - -* | | |
| **a. Processors/crushers** | | | | | | | | |
| 1. In Iowa | % | % | % | % | 100% | | | |
| 2. Out of state | % | % | % | % | 100% | | | |
| **b. River terminals** | | | | | | | | |
| 1. Illinois River | % | % | % | % | 100% | | | |
| 2. Mississippi River | % | % | % | % | 100% | | | |
| 3. Missouri River | % | % | % | % | 100% | | | |
| 4. Other | % | % | % | % | 100% | | | |
| **c. Direct to export market** | | | | | | | | |
| 1. Gulf Coast | % | % | % | % | 100% | | | |
| 2. West Coast | % | % | % | % | 100% | | | |
| 3. Mexico | % | % | % | % | 100% | | | |
| 4. Other | % | % | % | % | 100% | | | |
| **d. Other** | % | % | % | % | 100% | | | |
| Total | 100% | | | | | | | |

9. How many bushels of corn and soybeans were containerized by your firm during the **2006** crop year?

Corn ..... bu. Soybeans ..... bu.

10. Considering your facility's transportation fleet, how many of the following are owned or leased?

| | Currently | | By 2012 | |
|---|---|---|---|---|
| | Own | Lease | Own | Lease |
| a. Trucks ..... | | | | |
| b. Rail cars ..... | | | | |
| c. Barges ..... | | | | |
| d. Shipping containers ..... | | | | |

11. How would you rate Iowa's freight infrastructure? *Circle one answer in each row.*

| | Poor | | Average | | Excellent | N/A |
|---|---|---|---|---|---|---|
| a. Rail lines | 1 | 2 | 3 | 4 | 5 | N/A |
| b. Roadways | | | | | | |
| 1. Interstates | 1 | 2 | 3 | 4 | 5 | N/A |
| 2. Primary state highways | 1 | 2 | 3 | 4 | 5 | N/A |
| 3. Paved county roads | 1 | 2 | 3 | 4 | 5 | N/A |
| 4. Unimproved gravel roads | 1 | 2 | 3 | 4 | 5 | N/A |
| c. Waterways | 1 | 2 | 3 | 4 | 5 | N/A |

12. Do you consider the following items to be a hindrance to more efficient marketing? *Circle one answer in each row.*

| | Not at all | | Some what | | Definitely | N/A |
|---|---|---|---|---|---|---|
| a. Road weight restrictions en route to your facility | 1 | 2 | 3 | 4 | 5 | N/A |
| b. Bridge weight restrictions en route to your facility | 1 | 2 | 3 | 4 | 5 | N/A |
| c. Availability of seasonal labor | 1 | 2 | 3 | 4 | 5 | N/A |
| d. Storage capacity at your facility | 1 | 2 | 3 | 4 | 5 | N/A |
| e. Unloading times at your facility | 1 | 2 | 3 | 4 | 5 | N/A |
| f. Trucking costs | 1 | 2 | 3 | 4 | 5 | N/A |
| g. Access to rail service | 1 | 2 | 3 | 4 | 5 | N/A |
| h. Rail service reliability | 1 | 2 | 3 | 4 | 5 | N/A |
| i. Rail service costs | 1 | 2 | 3 | 4 | 5 | N/A |
| j. Access to barge service | 1 | 2 | 3 | 4 | 5 | N/A |
| k. Barge service reliability | 1 | 2 | 3 | 4 | 5 | N/A |
| l. Barge service costs | 1 | 2 | 3 | 4 | 5 | N/A |
| m. Other (please specify)_____ | 1 | 2 | 3 | 4 | 5 | N/A |

13. Comments

_____

_____

Respondent _____

Title _____ Phone _____ Date _____

Email (*please print)* _____

*Thank you for your time and cooperation.*

## Appendix C. Iowa Corn Processors Marketing Survey

### Iowa Corn Processors Marketing Survey

**Date**

1a. How does your facility process corn? ☐ wet mill ☐ dry mill

1b. Does your facility produce ethanol? ☐ yes ☐ no

*If no, skip to question 4.*

2. Please specify the nameplate capacity for ethanol production in your facility.

| | |
|---|---|
| a) Currently | gallons per year |
| b) By 2012 | gallons per year |

3. Please indicate the volume of ethanol and co-products your facility produced in the **2006** marketing year from September 1, 2006 through August 31, 2007?

| | *Dry mill production* | | *Wet mill production* | |
|---|---|---|---|---|
| *Ethanol* | *Distiller's grains* | | *Corn gluten meal* | *Corn gluten feed* |
| | *Dry* | *Wet* | | |
| gal. | tons | tons | tons | tons |

4. Please indicate the amount of corn processed by your facility from September 1, 2006 through August 31, 2007. _____ bu.

5. Does your facility plan to expand by 2012? ☐ yes ☐ no ☐ don't know

*If no or don't know, please skip to question 7.*

6. How many bushels of corn will the facility process annually by 2012? _____ bu.

7. What percentage of total dollar sales for your facility does each of the following products represent for the **2006** marketing year?

| | |
|---|---|
| a. Ethanol | % |
| b. Wet distiller's grains | % |
| c. Dry distiller's grains | % |
| d. Corn gluten meal | % |
| e. Corn gluten feed | % |
| f. Other products | % |
| Total | 100% |

8. 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.

**CORN PURCHASES AND PRODUCT SALES from September 1, 2006 through August 31, 2007**

| *Market* | *Percent by volume* | *Percent shipped by* | | | | *Average distance by* | | |
|---|---|---|---|---|---|---|---|---|
| | | *Truck* | *Rail* | *Barge* | *Total* | *Truck* | *Rail* | *Barge* |
| **a. Corn purchases** | | | | | | *- - - - one-way miles - - - -* | | |
| 1. In Iowa | % | % | % | % | 100% | | | |
| 2. Out of state | % | % | % | % | 100% | | | |
| Total | 100% | | | | | | | |
| **b. Ethanol sales** | | | | | | | | |
| 1. In Iowa | % | % | % | % | 100% | | | |
| 2. Other states | % | % | % | % | 100% | | | |
| 3. International | % | % | % | % | 100% | | | |
| Total | 100% | | | | | | | |
| **c. Dry distiller's grains sales** | | | | | | | | |
| 1. In Iowa | % | % | % | % | 100% | | | |
| 2. Other states | % | % | % | % | 100% | | | |
| 3. International | % | % | % | % | 100% | | | |
| Total | 100% | | | | | | | |
| **d. Wet distiller's grains sales** | | | | | | | | |
| 1. In Iowa | % | % | % | % | 100% | | | |
| 2. Out of state | % | % | % | % | 100% | | | |
| Total | 100% | | | | | | | |
| **e. Corn gluten meal sales** | | | | | | | | |
| 1. In Iowa | % | % | % | % | 100% | | | |
| 2. Other states | % | % | % | % | 100% | | | |
| 3. International | % | % | % | % | 100% | | | |
| Total | 100% | | | | | | | |
| **f. Corn gluten feed sales** | | | | | | | | |
| 1. In Iowa | % | % | % | % | 100% | | | |
| 2. Other states | % | % | % | % | 100% | | | |
| 3. International | % | % | % | % | 100% | | | |
| Total | 100% | | | | | | | |
| **g. Other products** | | % | % | % | 100% | | | |

9. Does your facility currently have a specialty grain program to purchase grain with specific traits?..... ☐ yes ☐ no ☐ don't know

10. Does your facility plan to have a specialty grain program by 2012?..... ☐ yes ☐ no ☐ don't know

11. What percentage (by volume) of your facility's products are sold to the following states?

| | Ethanol | Dry distiller's grains | Wet distiller's grains | Corn gluten meal | Corn gluten feed |
|---|---|---|---|---|---|
| WA, OR, ID | % | % | % | % | % |
| CA, AZ, NV, UT | % | % | % | % | % |
| TX, OK, NM | % | % | % | % | % |
| NC, SC, GA | % | % | % | % | % |
| NY, ME, NH, MA, RI, VT, CT | % | % | % | % | % |
| Other | % | % | % | % | % |
| Total | 100% | 100% | 100% | 100% | 100% |

12. Considering your facility's transportation fleet for ethanol delivery, how many of the following are owned or leased?

| | Currently | | By 2012 | |
|---|---|---|---|---|
| | Own | Lease | Own | Lease |
| a. Trucks..... | | | | |
| b. Rail cars..... | | | | |
| c. Barges..... | | | | |

13. Considering your facility's transportation fleet for livestock feed delivery, how many of the following are owned or leased?

| | Currently | | By 2012 | |
|---|---|---|---|---|
| | Own | Lease | Own | Lease |
| a. Trucks..... | | | | |
| b. Rail cars..... | | | | |
| c. Barges..... | | | | |

14. Does your facility currently use a fractionation process prior to fermentation? ..... ☐ yes ☐ no ☐ don't know

15. Does your facility plan to use a fractionation process prior to fermentation by 2012?..... ☐ yes ☐ no ☐ don't know

16. Does your facility currently extract corn oil?..... ☐ yes ☐ no ☐ don't know

17. Does your facility plan to extract corn oil by 2012? ..... ☐ yes ☐ no ☐ don't know

18. Does your facility plan to add cellulosic ethanol capabilities (deriving ethanol from corn stover, switchgrass, etc.) by 2012? ..... ☐ yes ☐ no ☐ don't know

19. How would you rate Iowa's freight infrastructure? *Circle one answer in each row.*

| | Poor | | Average | | Excellent | N/A |
|---|---|---|---|---|---|---|
| a. Rail lines | 1 | 2 | 3 | 4 | 5 | N/A |
| b. Roadways | | | | | | |
| 1. Interstates | 1 | 2 | 3 | 4 | 5 | N/A |
| 2. Primary state highways | 1 | 2 | 3 | 4 | 5 | N/A |
| 3. Paved county roads | 1 | 2 | 3 | 4 | 5 | N/A |
| 4. Unimproved gravel roads | 1 | 2 | 3 | 4 | 5 | N/A |
| c. Waterways | 1 | 2 | 3 | 4 | 5 | N/A |

20. Do you consider the following items to be a hindrance to more efficient marketing? *Circle one answer in each row.*

| | Not at all | | Some what | | Definitely | N/A |
|---|---|---|---|---|---|---|
| a. Road weight restrictions en route to your facility | 1 | 2 | 3 | 4 | 5 | N/A |
| b. Bridge weight restrictions en route to your facility | 1 | 2 | 3 | 4 | 5 | N/A |
| c. Storage capacity at your facility | 1 | 2 | 3 | 4 | 5 | N/A |
| d. Unloading times at your facility | 1 | 2 | 3 | 4 | 5 | N/A |
| e. Trucking costs | 1 | 2 | 3 | 4 | 5 | N/A |
| f. Access to rail service | 1 | 2 | 3 | 4 | 5 | N/A |
| g. Rail service reliability | 1 | 2 | 3 | 4 | 5 | N/A |
| h. Rail service costs | 1 | 2 | 3 | 4 | 5 | N/A |
| i. Access to barge service | 1 | 2 | 3 | 4 | 5 | N/A |
| j. Barge service reliability | 1 | 2 | 3 | 4 | 5 | N/A |
| k. Barge service costs | 1 | 2 | 3 | 4 | 5 | N/A |
| l. Other (please specify)_____ | 1 | 2 | 3 | 4 | 5 | N/A |

21. Comments

_____

_____

Respondent _____

Title _____ Phone _____ Date _____

Email (*please print)* _____

*Thank you for your time and cooperation.*

## Appendix D. Iowa Soybean Processors Marketing Survey

### Iowa Soybean Processors Marketing Survey

**Date**

1. How many bushels of soybeans can be crushed on site annually? _____ bushels

2. Are there plans to add to soybean crushing capacity on site?..... ☐ yes ☐ no ☐ don't know

*If no or don't know, skip to question 4.*

**3. How many bushels of soybeans are expected to be crushed on site annually by 2012? ....._____ bu.**

**4. Please indicate the volume of soybeans purchased and soybean products sold by your facility in the 2006 marketing year from** September 1, 2006 through August 31, 2007?

| | *Soybeans purchased* | *Soybean oil sold* | | *Soybean meal sold* |
|---|---|---|---|---|
| | | *Industrial use* | *Food use* | |
| Total 2006 Marketing Year | bu. | lbs. | lbs. | tons |

5. What percentage of total dollar sales for your facility does each of the following products represent for the **2006** marketing year?

| | |
|---|---|
| a. Soybean meal..... | % |
| b. Soybean oil..... | % |
| c. Other products..... | % |
| Total ..... | 100 % |

6. What is the composition of your facility's transportation fleet?

| | Currently | | By 2012 | |
|---|---|---|---|---|
| | Own | Lease | Own | Lease |
| a. Trucks ..... | | | | |
| b. Rail cars ..... | | | | |
| c. Barges ..... | | | | |
| d. Shipping containers..... | | | | |

7. 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.

**SOYBEAN PURCHASES AND PRODUCT SALES from September 1, 2006 through August 31, 2007**

| *Market* | *Percent by volume* | *Percent shipped by* | | | | *Average distance by* | | |
|---|---|---|---|---|---|---|---|---|
| | | *Truck* | *Rail* | *Barge* | *Total* | *Truck* | *Rail* | *Barge* |
| | | | | | | *- - - - one-way miles - - - -* | | |
| **a. Soybean purchases** | | | | | | | | |
| 1. In Iowa | % | % | % | % | 100% | | | |
| 2. Out of state | % | % | % | % | 100% | | | |
| Total | 100% | | | | | | | |
| **b. Soybean meal sales** | | | | | | | | |
| 1. In Iowa | % | % | % | % | 100% | | | |
| 2. Other states | % | % | % | % | 100% | | | |
| 3. International | % | % | % | % | 100% | | | |
| Total | 100% | | | | | | | |
| **c. Soybean oil sales for industry use** | | | | | | | | |
| 1. In Iowa | % | % | % | % | 100% | | | |
| 2. Other states | % | % | % | % | 100% | | | |
| 3. International | % | % | % | % | 100% | | | |
| Total | 100% | | | | | | | |
| **d. Soybean oil sales for food use** | | | | | | | | |
| 1. In Iowa | % | % | % | % | 100% | | | |
| 2. Other states | % | % | % | % | 100% | | | |
| 3. International | % | % | % | % | 100% | | | |
| Total | 100% | | | | | | | |
| **e. Other products** | | % | % | % | 100% | | | |

8. What percentage (by volume) of your facility's products are sold to the following states?

| | NY, NH, CT, RI, ME, MA, VT | WA, OR, ID | CA, AZ, NV, UT | TX, OK, NM | NC, SC, GA | Other | Total |
|---|---|---|---|---|---|---|---|
| Soybean meal ..... | % | % | % | % | % | % | 100% |
| Soybean oil for industrial use ..... | % | % | % | % | % | % | 100% |
| Soybean oil for food use..... | % | % | % | % | % | % | 100% |

9. How would you rate Iowa's freight infrastructure? *Circle one answer in each row.*

| | Poor | | Average | | Excellent | N/A |
|---|---|---|---|---|---|---|
| a. Rail lines | 1 | 2 | 3 | 4 | 5 | N/A |
| b. Roadways | | | | | | |
| 1. Interstates | 1 | 2 | 3 | 4 | 5 | N/A |
| 2. Primary state highways | 1 | 2 | 3 | 4 | 5 | N/A |
| 3. Paved county roads | 1 | 2 | 3 | 4 | 5 | N/A |
| 4. Unimproved gravel roads | 1 | 2 | 3 | 4 | 5 | N/A |
| c. Waterways | 1 | 2 | 3 | 4 | 5 | N/A |

10. Do you consider the following items to be a hindrance to more efficient marketing? *Circle one answer in each row.*

| | Not at all | | Some what | | Definitely | N/A |
|---|---|---|---|---|---|---|
| a. Road weight restrictions en route to your facility | 1 | 2 | 3 | 4 | 5 | N/A |
| b. Bridge weight restrictions en route to your facility | 1 | 2 | 3 | 4 | 5 | N/A |
| c. Storage capacity at your facility | 1 | 2 | 3 | 4 | 5 | N/A |
| d. Unloading times at your facility | 1 | 2 | 3 | 4 | 5 | N/A |
| e. Trucking costs | 1 | 2 | 3 | 4 | 5 | N/A |
| f. Access to rail service | 1 | 2 | 3 | 4 | 5 | N/A |
| g. Rail service reliability | 1 | 2 | 3 | 4 | 5 | N/A |
| h. Rail service costs | 1 | 2 | 3 | 4 | 5 | N/A |
| i. Access to barge service | 1 | 2 | 3 | 4 | 5 | N/A |
| j. Barge service reliability | 1 | 2 | 3 | 4 | 5 | N/A |
| k. Barge service costs | 1 | 2 | 3 | 4 | 5 | N/A |
| l. Other (please specify)_____ | 1 | 2 | 3 | 4 | 5 | N/A |

11. Comments

_____

_____

Respondent _____

Title _____ Phone _____ Date _____

Email (*please print)* _____

*Thank you for your time and cooperation.*

## Appendix E. Iowa Biodiesel Producers Marketing Survey

### Iowa Biodiesel Producers Marketing Survey

**Date**

1. Please specify the nameplate capacity for biodiesel production in your facility.

| | |
|---|---|
| a. Currently..... | gallons per year |
| b. By 2012..... | gallons per year |

2. Please indicate the volume of biodiesel and co-products your facility produced from September 1, 2006 through August 31, 2007?

| | *Biodiesel* | *Glycerin* |
|---|---|---|
| Total **2006** marketing year ..... | gal. | tons |

3. Are there plans to add soybean crushing capacity on site? ☐ yes ☐ no ☐ don't know

*If no or don't know, skip to question 5.*

4. How many bushels of soybeans are expected to be crushed on site annually by 2012? ..... _____ bu.

5. Please indicate the feedstocks and amounts processed by your facility during the **2006** marketing year (September 1, 2006 through August 31, 2007) and the feedstocks and amounts expected to be processed during the 2012 marketing year.

| *Feedstock* | *2006 marketing year* | *2012 marketing year* |
|---|---|---|
| a. Soybean oil ..... | pounds | pounds |
| b. Animal fats..... | pounds | pounds |
| c. Other..... | pounds | pounds |

6. What were your feedstock 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.

**FEEDSTOCK PURCHASES from September 1, 2006 through August 31, 2007**

| *Market* | *Percent by volume* | *Percent shipped by* | | | | *Average distance by* | | |
|---|---|---|---|---|---|---|---|---|
| | | *Truck* | *Rail* | *Barge* | *Total* | *Truck* | *Rail* | *Barge* |
| | | | | | | *- - - - one-way miles - - - -* | | |
| **a. Soybean oil** | | | | | | | | |
| 1. In Iowa | % | % | % | % | 100% | | | |
| 2. Out of state | % | % | % | % | 100% | | | |
| Total | 100% | | | | | | | |
| **b. Animal fats** | | | | | | | | |
| 1. In Iowa | % | % | % | % | 100% | | | |
| 2. Out of state | % | % | % | % | 100% | | | |
| Total | 100% | | | | | | | |
| **c. Other feedstocks** | | | | | | | | |
| 1. In Iowa | % | % | % | % | 100% | | | |
| 2. Out of state | % | % | % | % | 100% | | | |
| Total | 100% | | | | | | | |

7. What is the composition of your facility's transportation fleet?

| | *Currently* | | *By 2012* | |
|---|---|---|---|---|
| | *Own* | *Lease* | *Own* | *Lease* |
| a. Trucks ..... | | | | |
| b. Rail Cars ..... | | | | |
| c. Barges ..... | | | | |

8. What were your biodiesel-related 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.

**PRODUCT SALES from September 1, 2006 through August 31, 2007**

| *Market* | *Percent by volume* | *Percent shipped by* | | | | *Average distance by* | | |
|---|---|---|---|---|---|---|---|---|
| | | *Truck* | *Rail* | *Barge* | *Total* | *Truck* | *Rail* | *Barge* |
| | | | | | | *- - - - one-way miles - - - -* | | |
| **a. Biodiesel** | | | | | | | | |
| 1. In Iowa | % | % | % | % | 100% | | | |
| 2. Other states | % | % | % | % | 100% | | | |
| 3. International | % | % | % | % | 100% | | | |
| Total | 100% | | | | | | | |
| **b. Glycerin** | | | | | | | | |
| 1. In Iowa | % | % | % | % | 100% | | | |
| 2. Other states | % | % | % | % | 100% | | | |
| 3. International | % | % | % | % | 100% | | | |
| Total | 100% | | | | | | | |
| **c. Other products** | | % | % | % | 100% | | | |

9. What percentage (by volume) of your facility's products are sold to the following states?

| | NY, NH, CT, RI, ME, MA, VT | *WA, OR, ID* | *CA, AZ, NV, UT* | *TX, OK, NM* | *NC, SC, GA* | *Other* | *Total* |
|---|---|---|---|---|---|---|---|
| Biodiesel ..... | % | % | % | % | % | % | 100% |
| Glycerin..... | % | % | % | % | % | % | 100% |
| Other Products ..... | % | % | % | % | % | % | 100% |

10. What percentage of total biodiesel-related dollar sales for your facility does each of the following products represent for the **2006** marketing year?

| | |
|---|---|
| a. Biodiesel ..... | % |
| b. Glycerin ..... | % |
| c. Other products..... | % |
| d. Total..... | 100 % |

11. How would you rate Iowa's freight infrastructure? *Circle one answer in each row.*

| | *Poor* | | *Average* | | *Excellent* | *N/A* |
|---|---|---|---|---|---|---|
| a. Rail lines | 1 | 2 | 3 | 4 | 5 | N/A |
| b. Roadways | | | | | | |
| 1. Interstates | 1 | 2 | 3 | 4 | 5 | N/A |
| 2. Primary state highways | 1 | 2 | 3 | 4 | 5 | N/A |
| 3. Paved county roads | 1 | 2 | 3 | 4 | 5 | N/A |
| 4. Unimproved gravel roads | 1 | 2 | 3 | 4 | 5 | N/A |
| c. Waterways | 1 | 2 | 3 | 4 | 5 | N/A |

12. Do you consider the following items to be a hindrance to more efficient marketing? *Circle one answer in each row.*

| | *Not at all* | | *Some what* | | *Definitely* | *N/A* |
|---|---|---|---|---|---|---|
| a. Road weight restrictions en route to your facility | 1 | 2 | 3 | 4 | 5 | N/A |
| b. Bridge weight restrictions en route to your facility | 1 | 2 | 3 | 4 | 5 | N/A |
| c. Storage capacity at your facility | 1 | 2 | 3 | 4 | 5 | N/A |
| d. Unloading times at your facility | 1 | 2 | 3 | 4 | 5 | N/A |
| e. Trucking costs | 1 | 2 | 3 | 4 | 5 | N/A |
| f. Access to rail service | 1 | 2 | 3 | 4 | 5 | N/A |
| g. Rail service reliability | 1 | 2 | 3 | 4 | 5 | N/A |
| h. Rail service costs | 1 | 2 | 3 | 4 | 5 | N/A |
| i. Access to barge service | 1 | 2 | 3 | 4 | 5 | N/A |
| j. Barge service reliability | 1 | 2 | 3 | 4 | 5 | N/A |
| k. Barge service costs | 1 | 2 | 3 | 4 | 5 | N/A |
| i. Other (please specify)_____ | 1 | 2 | 3 | 4 | 5 | N/A |

13. Comments

_____

_____

Respondent _____

Title _____ Phone _____ Date _____

Email (*please print)* _____

*Thank you for your time and cooperation.*

# References

Baumel, C.P., J-P. Gervais, H. Hommes, and C. O'Riley. 1996. "The Iowa Grain Flow Survey: Where and How Iowa Grain Producers and Country Elevators Ship Corn and Soybeans." Iowa State University, University Extension, September.

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