Northern Plains Grain Farm Truck Marketing Patterns

by Kimberly Vachal

A survey of farm operators in the Northern Plains Region was conducted to gather information about on-farm storage and truck markets. The objective of the study is to provide information about farm truck grain marketing patterns in the Northern Plains. There is no other source for this information. It should be complementary to other farm-to-market information and national commodity flow publications. Farmers may use the results for their own investment and productivity assessments. Local and regional planners and policy makers can use the information in calibrating travel demand and freight flow models for investment and asset management choices.

INTRODUCTION

Agriculture, including traditional grain markets and value-added activities such as food processing, biofuels production, and specialty grains, plays a large role in the economy of North Dakota and neighboring states. The 2012 Agricultural Census shows that farms in these states had crop sales of $32 billion (U.S. Department of Agriculture 2014a). In terms of private income for 2013, North Dakota generated 14.5% of its state gross domestic product from agriculture. That figure was similar in surrounding states: 15.3% in South Dakota, 7.4% in Montana, and 5.0% in Minnesota. The share of economic activity attributed to agriculture in these states is far greater than the role of agriculture in the nation's overall economy at 1.8% (U.S. Department of Commerce 2015).

Farm-generated truck movement is defined as the initial movement of grain from field to market delivery point in the distribution chain. It is especially important to understand the transportation patterns and trends for these farm truck shipments in making investment and policy decisions related to rural and agriculture-centric economies. National commodity transport data sources, such as the Commodity Flow Survey and Freight Analysis Framework, do not account for this farm-generated grain traffic (BTS 2010, Donnelly 2010). The objective of this study is to partially fill the information gap for the farm truck inventory and grain marketing patterns in the Northern Plains. Collecting truck and trip information directly from farm operators is optimal for understanding patterns and trends in farm-generated grain traffic. This traffic is not otherwise inventoried in national data sources, so it is the responsibility of individual states or other entities to collect and/or estimate farm-generated grain traffic. Findings should be unique and complementary to other farm-to-market studies (Baumel 1996, Tolliver et al. 2005, Tun-Hsiang and Hart 2009) and national commodity flow publications.

METHOD AND DATA

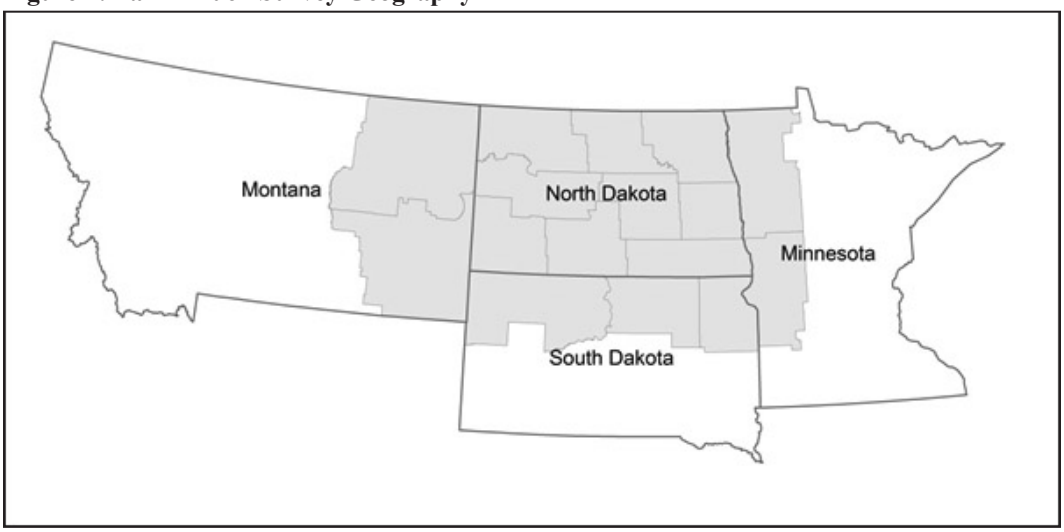
The survey method was used to collect the data needed for the study. The Upper Great Plains Transportation Institute (UGPTI) at North Dakota State University worked with the North Dakota Office of the Agricultural Statistics Service (NDASS) and the National Agricultural Statistics Service (NASS) of the U.S. Department of Agriculture to complete a survey of farmers in the region. The UGPTI was the lead agency in drafting the survey instrument and compiling survey results.

Mail and Phone Surveys

The survey process was a two-phase system. A stratified non-probability quota sample was used to select the farmers from the population for the survey. An initial mail survey was distributed to a sample of farmers in the NASS contact database. A follow-up phone survey of non-respondent farmers within that initial survey sample was completed to fulfill the sample size requirement. The number of surveys collected, overall and from within each of the state strata, was deemed sufficiently large to approximate random selection so generalizations could be made about the larger population within the budget and time constraints. Although random influences cannot be ruled out within this sample technique, confidence intervals are shown since the large regional sample is assumed to have normal probability distributions.

The sample was designed to collect data for a representative sample of corn, wheat, and soybean farms in North Dakota and the adjacent crop reporting districts (CRDs) from Montana, South Dakota, and Minnesota (Figure 1). The farms surveyed may produce one or all three commodities. The sample for the survey was derived from the larger population of farms that reportedly grew at least one of the major wheat, corn, and soybean crops based on the 2013 County Agricultural Production Survey (CAPS). This group is defined as the eligible farm population that was made up of the potential survey candidates. CAPS is a federally required submission used for federal farm program management at all jurisdictions. A random sample of 6,000 farms was drawn from the eligible population.

Figure 1: Farm Truck Survey Geography



Survey Responses

The survey was mailed to these 6,000 farmers in the survey region in June 2014. The agency received 623 responses from the mailed surveys. A month after the mailing, a phone survey of randomly selected non-respondent farmers was conducted. All survey efforts resulted in 3,005 valid responses for a response rate of 50%. Stratification of respondent figures by state and commodity show that a sufficient number were received to develop statistically robust results for farm-generated grain traffic.

Survey Results

The 3,005 survey responses were queried to create a profile of the farm truck fleet in the Northern Plains. This region is heavily involved in agriculture, with three of the states dedicating 60% of their land use to crop production. The highest shares were in North Dakota and South Dakota, where 87% and 88% of the land is in crop production, respectively. Montana has about 63% of its land area in crop production. Minnesota has the lowest share of its land in crop production, at 47%. The sample respondent group included a good representation of crops across the region (Table 1).

Table 1: Respondents Reporting Crop Production, by State and Commodity

State	Wheat	Corn	Soybean
Minnesota	38%	71%	57%
Montana	80%	13%	<1%
North Dakota	70%	55%	27%
South Dakota	26%	80%	47%
Overall	51%	61%	37%
n=3,005			

The respondent farm size averaged 750 harvested acres of corn, soybeans and wheat in 2013. The harvested acres for the three commodities ranged from two to 28,000 acres. A distribution of responses across quadrants shows about 22% to 28% of response farms in each of the farm size groups, defined as (1) less than 300 harvested acres, (2) 301 to 750 harvested acres, (3) 751 to 1,500 harvested acres, and (4) 1,501 or more harvested acres. The distribution across the farm group strata shows good representation of each group (Table 2).

Table 2: Farm Group Characteristics

Farm Group	Count	Percent	Average Harvested Acres
300 acres or fewer	706	26%	156
301 to 750 acres	594	22%	479
751 to 1,500 acres	772	28%	1,057
1,501 acres or more	672	24%	3,079
not reported=261			

Economies of size in the farm industry have been a key component in the continued evolution of this mature industry, especially for the commodity grains that are at the core of this study. Average farm size continues to increase (NASS 2014b). The ability of farms to spread costs, such as equipment and labor, over more acres is increasingly important with technology-enhanced farming and more expensive equipment needed to adopt it. The farm size has also been shown to relate positively to truck size, based on the economics of farm truck fleet decisions and with what has been observed in the market (Berwick et al. 2003).

MARKETING PATTERNS

Farm markets vary substantially across respondents because transportation for these major grains can simply be a short haul to on-farm storage or a longer haul to an elevator, feedlot, or processor facilities. The transportation resources consumed do reveal patterns for individual commodities.

In addition, responses to on-farm storage questions provide some insight into the timing of grain deliveries. Overall regional marketing patterns are useful. In addition, insight is provided in the market patterns among state and farm group strata. Statistical tests confirm that the marketing patterns do vary significantly for all commodities across farm group strata when considering the share of production transported directly to market when harvested for wheat [F(1,566)=5.13, ρ=<.002], corn [F(1,912)=12.99, ρ=<.001], and soybeans [F(1,796)=6.77, ρ=<.002] are significant at the 99th percentile based on generalized linear model results. Significant variance is also found among states for the wheat [F(1,591)=22.28, ρ=<.001] and soybeans [F(1,827)=4.97, ρ=<.002] marketing patterns, considering the share delivered directly from field to market.[1]

On-Farm Storage

On-farm storage for corn, soybeans, or wheat was confirmed by 83% of the respondent farms. The availability of on-farm storage was not answered in 10% of the surveys and was left blank in the remaining 7%. South Dakota had lowest share of farms with on-farm storage for corn, soybeans, or wheat at 84%. In North Dakota and Montana, 94% of the respondents confirmed on-farm storage availability. Minnesota had on-farm storage reported in 84% of responses. The role of on-farm storage is important in understanding farm-generated crop traffic. On-farm storage provides an easily accessible option to delay grain delivery beyond the harvest season. South Dakota reported the highest average storage capacity and Montana the lowest (Table 3).

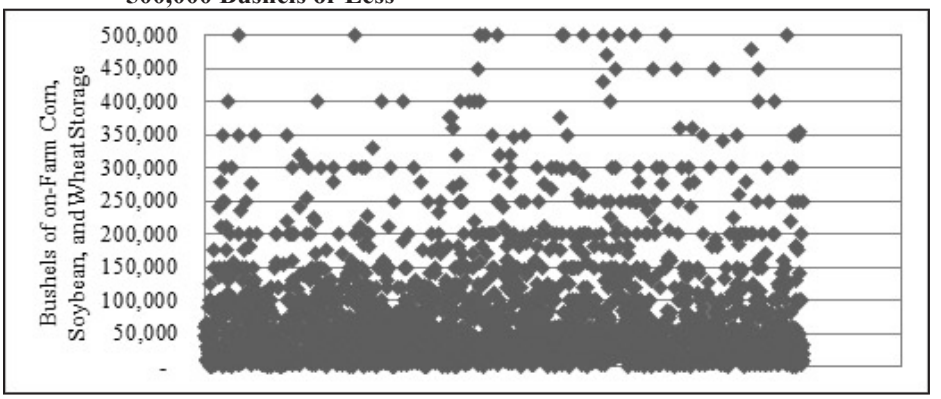
Table 3: Corn, Soybean and Wheat Storage Capacity, by State

Crop Reporting Districts	n	Storage Ratio, Bushels per Harvested Acre*	Average On-Farm Storage, Bushels*
Western Minnesota	769	77	156,276
Eastern Montana	360	70	103,904
All North Dakota	864	63	222,607
Northern South Dakota	751	69	374,173

*Weighted by Harvested Acres

On-farm storage is concentrated on the larger farms in terms of average capacity. In terms of flexibility, however, the smaller farms appear to be more able to adapt when increased on-farm storage is needed (Table 4). For the smallest farms, the ratio of storage capacity bushels per harvested acre was 151. The largest farms have an average of 62 bushels of on-farm storage for each harvested acre. The difference in the storage density may be related to expectations for yield among commodities. The median on-farm storage capacity was 50,000 bushels, with 25% reporting fewer than 20,000 bushels. A scatterplot illustrates the distribution for the responses with storage of 500,000 bushels or less (Figure 2). The survey had 28 responses from farms with more than a half-million bushels of storage. Among the facilities, 11 were in North Dakota, 10 in the northern South Dakota CRDs, six in the western Minnesota region, and a single location in eastern Montana. The higher storage volumes were attributed to the large farms of over 1,500 acres in 26 of the 28 cases.

Figure 2: Scatterplot of Reported On-Farm Storage Capacity, Farms with 500,000 Bushels or Less



The storage capacity density, measured by farms as bushels produced per harvested acre (including corn, soybean, and wheat), was inversely related to farm size (Table 4). The storage capacity volume, however, is substantially greater for the larger farms. Average on-farm storage was 329,097 bushels of corn, soybean, and wheat capacity for farms of 1,501 acres or more. The smallest farms averaged only 26,252 bushels of capacity for the three commodities.

Table 4: Corn, Soybean and Wheat Storage Capacity, by Farm Group

Farm Group	n	Share in Farm Groups	Average Storage Ratio, Bushels per Harvested Acre*	Average On-Farm Storage, Bushels*
300 acres or fewer	706	26%	151	26,252
301 to 750 acres	594	22%	82	40,003
751 to 1,500 acres	772	28%	73	80,718
1,501 acres or more	672	24%	62	329,097

*Weighted by Harvested Acres

On-farm storage is concentrated on the larger farms in terms of average capacity. In terms of flexibility, however, the smaller farms appear to be more able to adapt when increased on-farm storage is needed (Table 4). For the smallest farms, the ratio of storage capacity bushels per harvested acre was 151. The largest farms have an average of 62 bushels of on-farm storage for each harvested acre. The difference in the storage density may be related to expectations for yield among commodities. For instance, average corn yield in 2013 was 110 bushels per acre compared with 31 and 45 bushels per acre for soybean and wheat, respectively (NASS 2014a). Survey responses do support this premise for the larger farms reporting more harvested corn acres. Among farms larger than 1,501 acres reporting at least half of their harvested acres were corn, the ratio of storage bushels to harvested acres was 75 (n=198) 95% CI [50, 59] compared with 54 (n=436) 95% CI [69, 81] for farms attributing less than half their harvested acres to corn. Understanding farm-based storage capacity is important in discussing and predicting transportation scenarios for the industry.

The role of on-farm storage is important in understanding farm-generated crop traffic. On-farm storage provides an easily accessible option to delay grain delivery beyond the harvest season. In addition to the insight gained from the higher-yield corn stratification of the responses regarding the density of farm storage capacity, farmers were asked the share of the crop production delivered directly to market from the field at harvest time. Responses weighted by bushels produced, showed 36% of wheat (n=1,518) 95% CI [32%, 39%] and 32% of corn (n=1,835) 95% CI [30%, 36%]

was delivered directly to an elevator, feedlot, or processor market. The average share of soybeans delivered directly to market from field is substantially higher at 66% (n=1,748) 95% CI [63%, 69%]. Among the state strata, the adjacent South Dakota farmers reported delivering the largest share of wheat directly to market at harvest at 50%, compared with 31%, 33%, and 36% for Minnesota, Montana, and North Dakota, respectively. On average, corn share delivered to market at harvest ranged from 32% in South Dakota to 39% in Montana. Minnesota farmers reported an average 34% and North Dakota farmers reported 33%. All averages are weighted based on respondents' reported production of the commodity.

A differentiation in the timing for crop delivery can also be recognized when considering the farm group strata. Table 2 shows that among the farm groups, the larger farms tend to deliver a smaller share of their production directly to market at harvest. Table 5 shows a larger proportion of soybeans are delivered directly to market by farms of all sizes, but the smallest share is for the largest farms. With a continued trend toward larger farms, note the storage propensity for larger farms is a factor in the farm-generated crop traffic. Operational factors, such as seasonal load regulations, may require additional consideration as the industry's production and marketing practices continue to evolve.

Table 5: Crop Delivery from Field to Market, by Farm Group

Commodity	Farm Group	n	Average	Standard Error[2]	95% Confidence Limit	
Wheat	300 acres or fewer	303	45%	3%	39%	52%
	301 to 750 acres	316	43%	3%	37%	48%
	751 to 1,500 acres	455	39%	2%	35%	42%
	1,501 acres or more	441	33%	3%	28%	38%
Corn	300 acres or fewer	391	47%	3%	42%	52%
	301 to 750 acres	372	49%	2%	45%	54%
	751 to 1,500 acres	553	37%	2%	33%	40%
	1,501 acres or more	514	29%	2%	24%	33%
Soybeans	300 acres or fewer	313	71%	3%	65%	78%
	301 to 750 acres	375	74%	2%	69%	78%
	751 to 1,500 acres	548	70%	2%	66%	74%
	1,501 acres or more	508	62%	2%	58%	67%

Note: Averages Weighted by Bushels Produced

Regional Markets

Farmers were asked to describe their corn, soybean, and wheat marketing patterns in 2013. For wheat harvested, farmers reported that as of May 1, 2014, about 16% of bushels produced remained in on-farm storage with the largest share, 79%, transported to elevators (Table 6). A small 2% share was hauled to processors. Soybean marketing patterns were similar for the share moved to elevators, but processors were a larger receiver at 9%. Farmers were less likely to use on-farm storage for soybeans than for wheat or corn. About half of the corn grown during 2013 was sold to an elevator. Similar to wheat, 17% of the 2013 corn crop was held in on-farm storage. Feed use accounted for about 14%, with the largest share being used for feed on farm.

Table 6: Regional Markets, 2013

	Wheat		Corn		Soybean	
n=	*1521*		*1821*		*1115*	
Market	Average	95% CI	Average	95% CI	Average	95% CI
Elevator	79%	77%, 81%	54%	51%, 58%	79%	77%, 82%
Processor	2%	1%, 4%	11%	8%, 13%	9%	6%, 13%
Feed Lot	0%	0%, 0%	4%	2%, 5%	0%	0%, 1%
Feed Own	0%	0%, 1%	10%	8%, 13%	0%	0%, 1%
Storage	16%	14%, 18%	17%	14%, 20%	7%	5%, 10%
Other	2%	1%, 3%	4%	0%, 8%	4%	0%, 8%

Markets, State Strata. Minnesota farmers in the western CRDs report a smaller share of wheat and soybeans delivered to elevators compared with the regional market average (Table 7). For wheat, a larger share of the 2013 crop was held on-farm at the time of the survey. A larger share of corn had been sold to elevators versus the regional average, with less used for feed on their own farms.

Table 7: Regional Markets for Wheat Produced in 2013, Minnesota

	Wheat		Corn		Soybean	
n=	*319*		*595*		*678*	
Market	Average	95% CI	Average	95% CI	Average	95% CI
Elevator	70%	63%, 76%	61%	56%, 65%	76%	73%, 80%
Processor	4%	0%, 8%	10%	5%, 14%	9%	6%, 13%
Feed Lot	1%	0%, 2%	5%	2%, 8%	1%	0%, 2%
Feed Own	0%	0%, 0%	6%	4%, 9%	0%	0%, 0%
Storage	23%	16%, 30%	17%	14%, 21%	8%	5%, 10%
Other	2%	0%, 3%	1%	0%, 1%	6%	1%, 10%

Montana farmers in the eastern CRDs had sold a larger share of their 2013 crop to elevators by May 1, 2014, compared with the regional average (Table 8). They held a smaller share in storage than other farmers in North Dakota and adjacent state CRDs. The limited response for corn production shows a much larger proportion of the corn grown in Montana is marketed to feedlots than in the remainder of the region. Montana farmers sold only about one in five bushels of corn to elevators compared with about one in two for the region on average.

Table 8: Regional Markets for Wheat Produced in 2013, Montana

	Wheat		Corn	
n=	*327*		*54*	
Market	Average	95% CI	Average	95% CI
Elevator	83%	79%, 87%	21%	51%, 58%
Processor	3%	0%, 7%	4%	8%, 13%
Feed Lot	0%	0%, 0%	54%	2%, 5%
Feed Own	1%	0%, 1%	16%	8%, 13%
Storage	12%	8%, 16%	4%	14%, 20%
Other	1%	0%, 2%	2%	0%, 8%

North Dakota mirrors the regional averages with regard to wheat, marketing 79% to elevators and storing 16% on-farm (Table 9). North Dakota farmers were more likely to sell corn to elevators and processors compared with the regional average, with a larger share remaining on-farm at the time of the survey. With regard to soybeans, North Dakota sold a larger share to elevators compared with the regional average. This soybean market pattern is expected given the longer distances for North Dakota farmers from soybean growing regions to processing plants in Minnesota and South Dakota. North Dakota elevators are strong suppliers to the Pacific Northwest soybean export market.

Table 9: Wheat, Corn, and Soybean Markets for 2013 Production, North Dakota

	Wheat		Corn		Soybean	
n=	*655*		*522*		*527*	
Market	Average	95% CI	Average	95% CI	Average	95% CI
Elevator	79%	77%, 82%	59%	55%, 64%	89%	87%, 91%
Processor	2%	0%, 3%	9%	5%, 13%	2%	0%, 3%
Feed Lot	0%	0%, 0%	2%	0%, 3%	1%	0%, 3%
Feed Own	0%	0%, 1%	3%	2%, 5%	0%	0%, 0%
Storage	16%	13%, 19%	23%	18%, 29%	6%	3%, 9%
Other	3%	1%, 4%	4%	0%, 7%	3%	1%, 5%

South Dakota's northern CRDs marketed a larger share of wheat and soybeans to elevators compared with the region on average with both crops at 82% (Table 10). South Dakota farmers had the smallest share of each crop held on-farm compared with the region. The figures are, however, close to the regional averages. South Dakota farmers sold a relatively smaller share of their corn, 49%, to elevators, and used a substantially larger share, 16%, for feed on their own farms.

Table 10: Wheat, Corn, and Soybean Markets for 2013 Production, South Dakota

	Wheat		Corn		Soybean	
n=	*220*		*669*		*541*	
Market	Average	95% CI	Average	95% CI	Average	95% CI
Elevator	82%	78%, 86%	49%	43%, 55%	82%	78%, 85%
Processor	1%	0%, 2%	12%	8%, 16%	10%	6%, 15%
Feed Lot	0%	0%, 0%	3%	1%, 5%	0%	0%, 0%
Feed Own	0%	0%, 0%	16%	12%, 21%	0%	0%, 1%
Storage	15%	10%, 20%	13%	10%, 17%	6%	4%, 9%
Other	2%	0%, 4%	6%	0%, 14%	2%	0%, 3%

Markets, Farm Group Strata. Farm Group 1, including farms with fewer than 300 acres, held a larger share of wheat, at 23%, in storage than the region average. These farm storage practices may be related to specialty or small scale milling operations that tend to have limited on-site inventory or to individual farmer decisions to hold inventory multiple years. Wheat that graded with higher milling quality characteristics has historically garnered a premium during years where weather or other factors lead to below average crop quality. The corn market is also somewhat different from the region for these farms using corn for feed, 19%, nearly double the share for the regional average. These smaller farms also report storing less of their corn and an equal share of their soybean crop, relative to the regional averages (Table 11).

Table 11: Wheat, Corn, and Soybean Markets for 2013 Production, Farm Group 1

	Wheat		Corn		Soybean	
n=	*303*		*392*		*314*	
Market	Average	95% CI	Average	95% CI	Average	95% CI
Elevator	72%	68%, 77%	56%	52%, 60%	85%	81%, 90%
Processor	1%	0%, 2%	3%	1%, 6%	5%	1%, 9%
Feed Lot	0%	0%, 1%	9%	6%, 13%	0%	0%, 0%
Feed Own	0%	0%, 1%	19%	15%, 23%	0%	0%, 1%
Storage	23%	16%, 29%	11%	8%, 14%	7%	1%, 12%
Other	3%	0%, 6%	2%	0%, 3%	3%	0%, 5%

Farm Group 2, which includes farms sized 301 to 750 harvested acres, was close to the regional averages in its wheat marketing. This group did report selling a larger share of each commodity to elevators compared with the regional average. With 80% of wheat, 62% of corn and 88% of soybeans marketed at the elevator, the shares are one percentage point higher for wheat and nine and eight percentage points higher than the region average for corn, and soybeans, respectively (Table 12).

Table 12: Wheat, Corn, and Soybean Markets for 2013 Production, Farm Group 2

	Wheat		Corn		Soybean	
n=	*313*		*372*		*375*	
Market	Average	95% CI	Average	95% CI	Average	95% CI
Elevator	80%	76%, 83%	62%	57%, 66%	88%	85%, 90%
Processor	1%	0%, 3%	6%	2%, 9%	5%	1%, 8%
Feed Lot	0%	0%, 0%	4%	0%, 8%	0%	0%, 0%
Feed Own	0%	0%, 1%	15%	10%, 19%	0%	0%, 1%
Storage	16%	12%, 20%	13%	10%, 17%	7%	4%, 10%
Other	2%	1%, 4%	1%	0%, 1%	0%	0%, 1%

Farms Between 751 and 1,500 acres comprise the operations in Farm Group 3. This group is similar to the regional market average in the distribution of corn, soybeans, and wheat. Elevators are the primary market for each commodity. Corn has the greatest diversification with regard to markets (Table 13).

Table 13: Wheat, Corn, and Soybean Markets for 2013 Production, Farm Group 3

	Wheat		Corn		Soybean	
n=	*457*		*555*		*550*	
Market	Average	95% CI	Average	95% CI	Average	95% CI
Elevator	76%	73%, 79%	57%	53%, 60%	81%	78%, 83%
Processor	3%	1%, 5%	9%	6%, 11%	8%	5%, 12%
Feed Lot	0%	0%, 1%	3%	2%, 4%	1%	0%, 2%
Feed Own	0%	0%, 1%	10%	7%, 13%	0%	0%, 0%
Storage	18%	15%, 21%	19%	16%, 23%	7%	5%, 8%
Other	2%	1%, 4%	3%	1%, 4%	3%	2%, 5%

Farm Group 4 includes the largest operations among the respondent farms, at least 1,501 acres. These operations are also similar to the regional market distributions. Farm Group 4 sells slightly more than the regional average share of its wheat and soybeans to elevators (Table 14). The average corn shares sold to elevators and for own feed use are slightly lower while the corn share sold to processors is above the regional average. Corn does show a greater variability with regard to market distribution, considering the standard errors. Figures for each commodity market sales share fall within the regional 95% confidence intervals.

Table 14: Wheat, Corn, and Soybean Markets for 2013 Production, Farm Group 4

	Wheat		Corn		Soybean	
n=	*441*		*516*		*508*	
Market	Average	95% CI	Average	95% CI	Average	95% CI
Elevator	80%	77%, 83%	53%	48%, 58%	82%	79%, 84%
Processor	2%	1%, 4%	12%	8%, 15%	7%	4%, 10%
Feed Lot	0%	0%, 1%	4%	2%, 6%	1%	0%, 2%
Feed Own	0%	0%, 1%	9%	6%, 13%	0%	0%, 1%
Storage	15%	12%, 18%	17%	14%, 21%	7%	4%, 9%
Other	2%	1%, 3%	5%	0%, 11%	4%	1%, 6%

SUMMARY

Agriculture is a large part of the economy in the Northern Plains region. Approximately 800 million bushels, or 30 million tons, of grain was moved to subterminal elevator facilities and local agricultural processors in 2010. These grain movements generate an estimated 900 million farm truck ton-miles. The objective of this study was to provide information about grain marketing patterns in the region since there is no other source for the information.

A survey of 6,000 farm operators in this Northern Plains region was conducted to gather information about transportation of crops and on-farm storage capacity. The survey was mailed to a sample of farmers and followed up with a phone survey of non-respondents. The survey responses represent corn, wheat, and soybean farms in North Dakota and the adjacent crop reporting districts.

The storage capacity density, measured by farm as bushels produced per harvested acre (including corn, soybeans, and wheat), was inversely related to the farm size. Storage capacity volume was substantially greater for the larger farms. Average on-farm storage was 26,525 bushels for the smallest farms and 329,097 bushels among the largest farms. Storage density for the smallest farms, considering a ratio of storage capacity bushels per harvested acre, was 151 and an average 62 bushels for the largest farms. On-farm storage provides an easily accessible option for delaying grain delivery beyond the harvest season. Responses, weighted by bushels produced, showed 36% of wheat, 32% of corn and 66% of soybeans were delivered directly to market from the field at harvest time.

Regarding shipment beyond the farm, about 79% of wheat and soybean production was delivered elevators. The share for corn to elevators was only 54%. Corn had the most diversity in terms of market patterns among the states and farm size strata with on-farm storage and feed use varying substantially among groups. Survey results reveal differences in marketing patterns among commodities. In addition, marketing differs significantly among states and by farm size. Farm grain truck transportation demand is expected to continue to evolve with agronomic advancements and continued industry consolidation. Findings will be useful in updating farm-to-market truck flows that are used to assess economic competitiveness, calibrate local traffic demand, and plan future investments.

Endnotes

1. Note that in this paper ‘state’ always refers to the group of CRDs surveyed from each respective state in the cases of Minnesota, Montana, and South Dakota so caution should be used in extrapolating any statewide figures based on the survey results for these states.
2. Standard Error figures are standard error of the mean for all reported survey statistics.

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