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The 1995 Minnesota Farmland Market: Further Signs of a Slowdown

Steven J. Taff

For the second straight year, the average sales price of Minnesota farmland went down—if only slightly—despite increases in some of our major producing areas. This generalization holds for several different "averages," each arithmetically valid, but each interpreting the underlying sales data in different ways (Table 1).

We cannot observe the average price of set of lands, whether for a township, or a county, or a state. Any reported "price" for a geographic area—other than for the parcel of land that actually sold—is necessarily a stand-in for some underlying sales price distribution. The average price can only hint at the shape of a distribution such as shown in Figure 1.

In this article, I'll try to explain where and why reported average prices changed (or didn't change, in many cases) since last year. In the process, we'll explore other aspects of the state's farmland market and a few of their implications for policymakers.

Data Manipulations

The factual basis of what follows is the set of recorded sales prices for land parcels classified as agricultural and for which the buyer has not indicated an intention of changing use. The 1,516 transactions analyzed here were finalized during the October 1, 1994 to September 30, 1995 "record year." Each sale record is associated with estimated values for buildings and other improvements, the size of the parcel, the number of tillable acres, and the township (or, rarely, the city) within which the parcel lies.

All property sales are reported to the Minnesota Department of Revenue by local assessors and auditors. Agency and county officials strive to identify and record every farmland sale, but they inevitably miss some. Consequently, readers should realize that changes in this number of sales reported from year to year may only partially reflect actual changes in market intensity.

In some of our research, we try to standardize sales prices by "adjusting for time and terms." We eliminate inflation over the course of the year (so that all sales are gauged as if they took

*(See **Market** page 2)*

Table 1: Statewide Average Per-Acre Price: Three Measures

	Number of Transactions	Recorded Price	Adjusted Price	Tillable Land Price
1993	1,100	$833	$827	$929
1994	1,424	$809	$796	$873
1995	1,516	$796	$776	$837

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How Farmers Get Their Grain to Town

Arthur Friesen, Jerry Fruin, and Allan Mussell

Introduction

Every year Minnesota farmers haul almost a billion bushels of grain from their fields. But our knowledge of how they do it generally has been based on anecdotes and opinions. Little research has been conducted in recent years on types of equipment, distance to markets, and the quality and surface types of roads used for grain movement. In this article we report some recent research in the Department of Applied Economics that examines farm-to-market grain movements in Minnesota. A survey of 651 producers from three crop-reporting districts helps us answer such questions as:

- Are farmers bypassing local elevators and hauling grain directly to river and lake terminals?
- How intensively are semis used?
- What are the impacts of spring road restrictions?
- How important is custom hauling?

*(See **Grain** page 7)*

Arthur Friesen was a research assistant, Jerry Fruin is an associate professor and extension economist, and Allan Mussell is a research assistant in the Department of Applied Economics.

(*Market* *continued from page 1*)

place on a single day) and take into account payment schedules, future balloon payments, and so on.

This latter adjustment can be significant with contracts for deed, which were especially evident in the early 1980s. In recent years, however, regular warranty deeds have been more common (Figure 2), so the terms-and-time adjustment has become less critical for analysts.

While these adjustments are useful for certain property tax equalization processes, they do not result in prices comparable to those estimated by the U.S. Department of Agriculture or by Professor Philip Raup's long-running farm real estate survey (which the present series succeeds).

In this article, therefore, I follow the practice of the past few years and report mostly the basic per-acre "recorded" price—the unadjusted total sales price divided by the number of deeded acres. For calculating averages, these prices are weighted by the acreage in the transaction. Although no way of calculating a per-acre price serves all purposes, this particular price is comparable with other price series and requires the fewest number of analysis assumptions.

The implication of my selection of the recorded price can be drawn from Figure 3, which shows the selected series along with a few others. The USDA numbers are survey estimates of land and building values as of January 1 of the noted year. Adjusted prices are both time- and terms-adjusted sales prices. The tillable land price is net of estimated building values.

Only the USDA survey estimates trend upward; actual sales prices are flat or declining over recent years. The decline is especially evident for tillable land prices: their average has gone down by 10% since 1993.

Another price series that is sometimes used by analysts is the estimates from local property tax assessors: estimated market value, or EMV. The data set I use here permits us to make a direct comparison between what assessors previously thought parcels might sell for and what they later actually did sell for.

Figure 4 suggests that on average, the assessors' EMV is a pretty good predictor of price, even though the value estimates preceded the actual sale by as many as two years.

Figure 1. Distribution of 1995 Minnesota Farmland Sales Prices

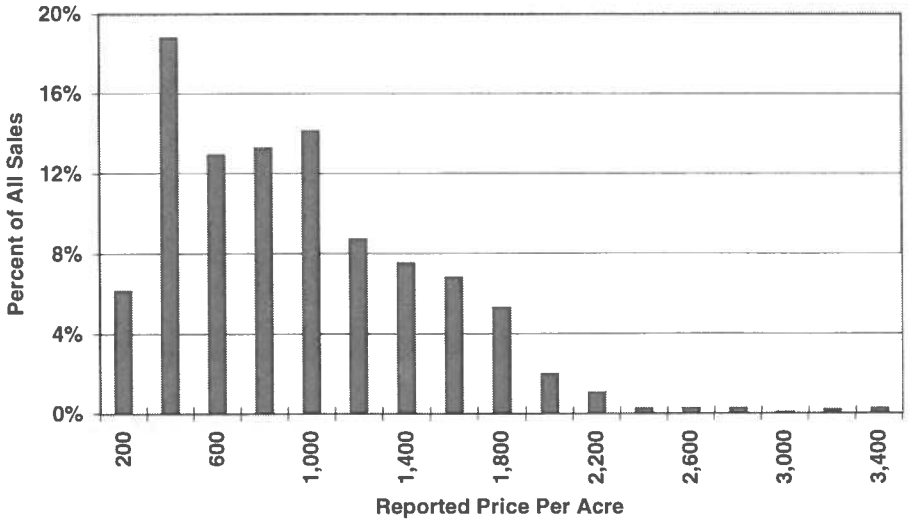


Figure 2. Deed Type for Minnesota Farmland Sales

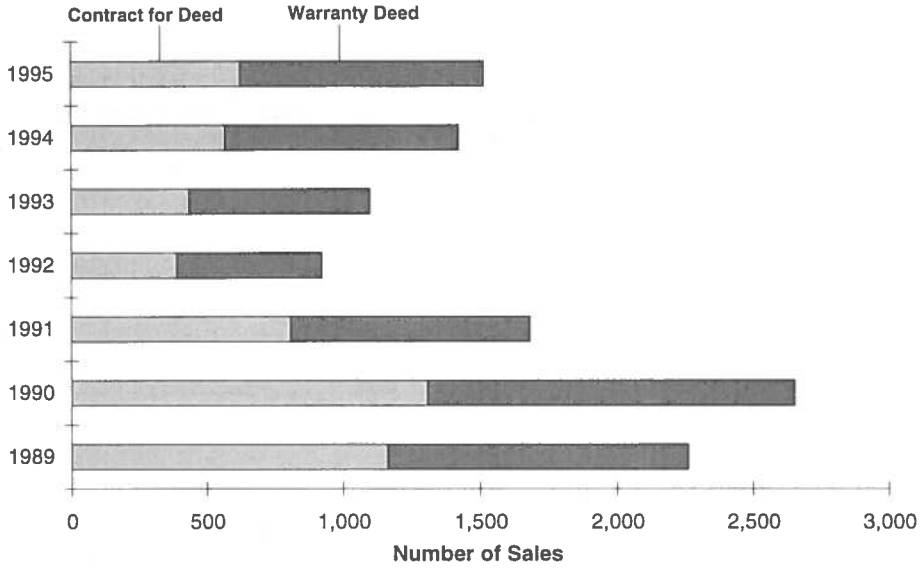
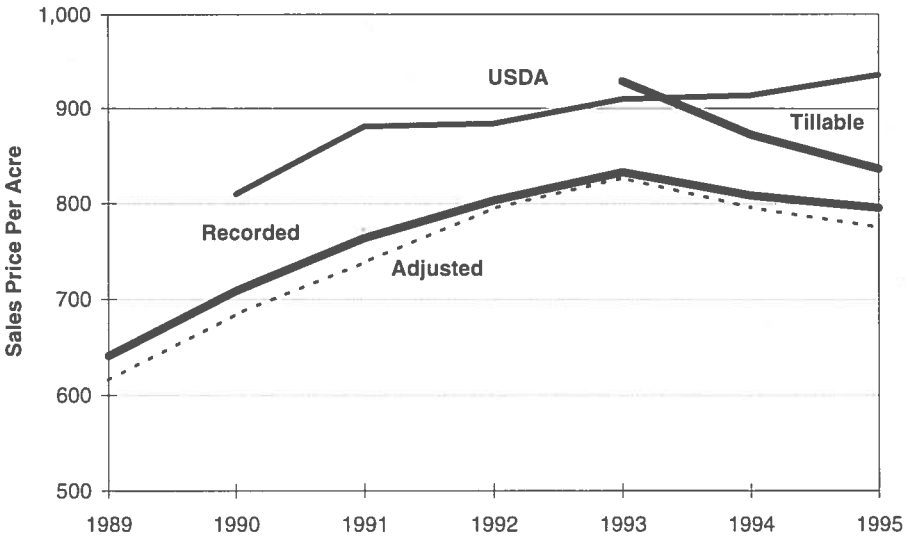


Figure 3. "Average" Minnesota Farmland Price Movements



Note: Tillable land prices were not calculated prior to 1993.

Out of these many possibilities, I'll report the data in as unadjusted and uninterpreted a form as practical, then show how the summary statistics might be manipulated to better get at what we seek: *the* price of Minnesota farmland.

It comes as no surprise that the answers we get depend upon the questions we ask. The tables and figures are largely self-explanatory, so I'll focus on the procedures used to generate them. Readers are encouraged to form their own conclusions from the data.

Data Aggregations

Analysts commonly look at two aspects of farmland price series: magnitude and movement.

Price levels: The magnitude of the average price is thought by some to be a useful guide to what land might sell for in the geographic area for which the series is reported. This can be stretched too far, of course. The set of lands actually sold certainly can be used as a predictor of other lands in the area that might also sell in the near future. But they are not necessarily representative of all land in the area, and they should be used cautiously as indicators of other items of interest, such as farm family economic well-being.

The price level is also sometimes used as a proxy for the average (and often unavailable) productivity of farmlands within the area. Or, if we know the productivity level, we might be able to use it to estimate the (sometimes unavailable) price level. The higher the average sales price, the better must be the land (or so goes the argument).

Again, one should proceed with caution here. Figure 5, which relates actual 1995 per-acre sales prices to an estimate of the whole parcel's average cropland productivity (measured here by the Cropland Equivalent Rating or CER), suggests that there is a modest positive relationship between the two. (Note that I show the calculated tillable land price in this instance.)

While the average sales price of the state's farmland has dropped slightly over the past few years, the distribution of sales prices has remained relatively constant—especially at the upper end of the price spectrum. Nearly all the drop can be explained by the more recent increase

Figure 4. Assessor's Estimates are Pretty Good Predictors of 1995 Farmland Sales Prices

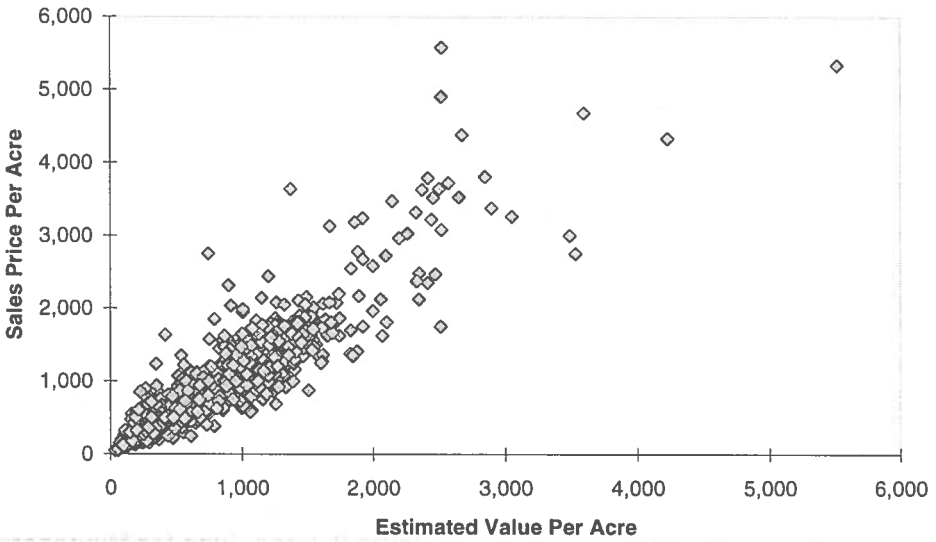


Figure 5. The Link Between 1995 Sales Prices and Land Productivity is Positive, But Not Too Strong

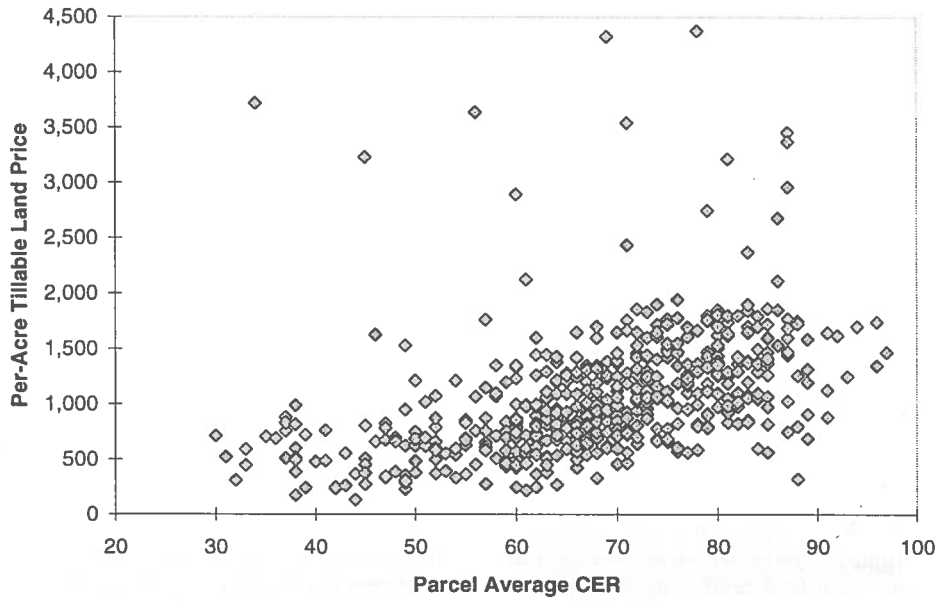


Figure 6. The Distribution of Farmland Sales Prices Has Shifted Slightly Toward the Lower End Over the Past Three Years

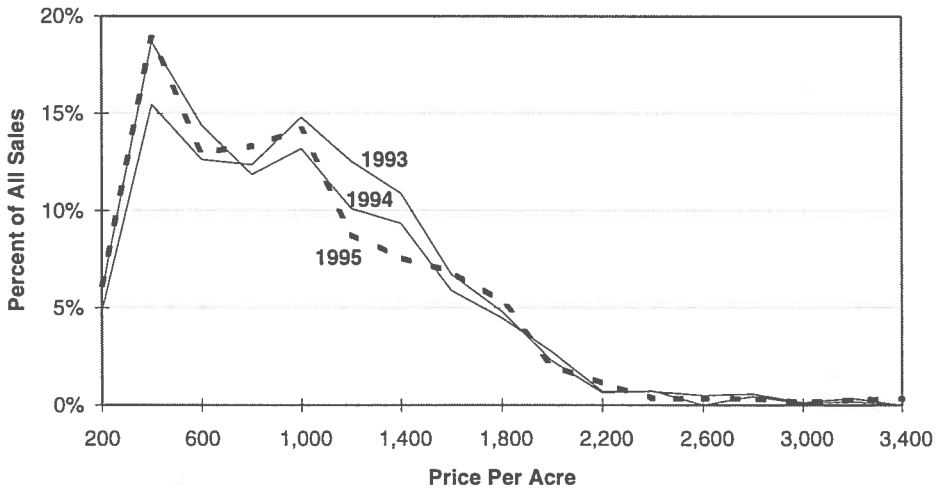
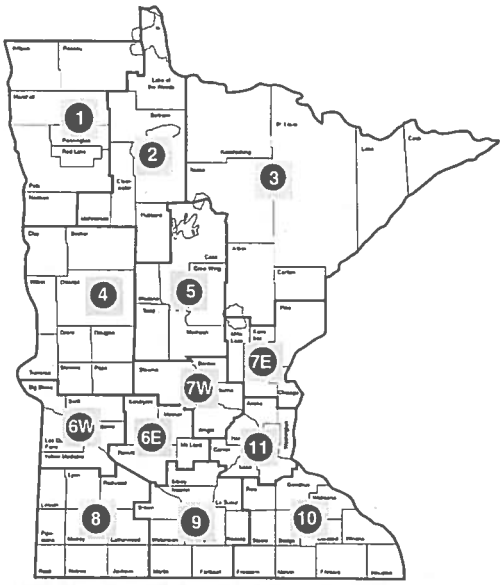
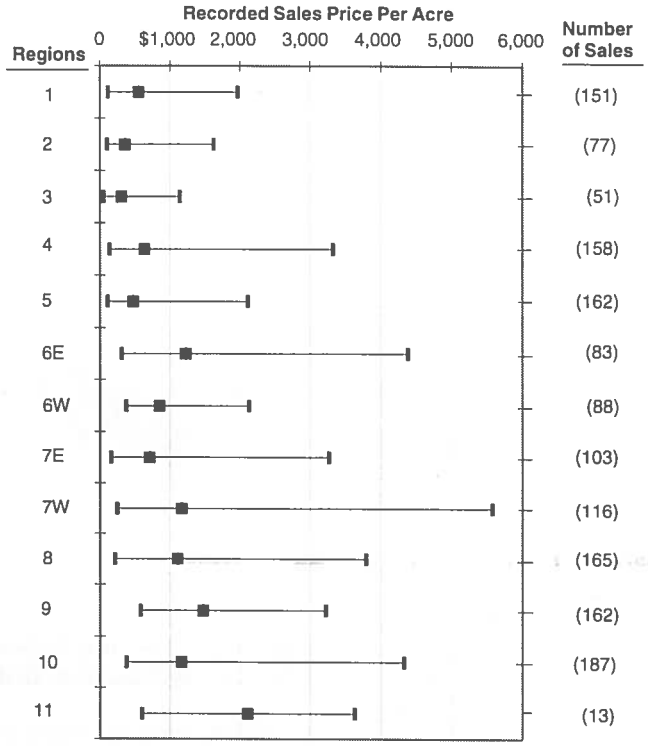


Figure 7. 1995 Farmland Sales Prices by Economic Development Region





in the relative proportion of lower priced sales (Figure 6).

Wide price ranges are evident also in Figure 7, which shows 1995 sales price spreads in each of the state's economic development regions. Dispersion is especially noticeable in the areas near the Twin Cities, reflecting, presumably, a significant non-agricultural component to value formation in those areas.

Price movements: Not surprisingly, different parts of the state exhibit different price patterns over time as well. Figure 8 demonstrates this clearly. The geographic areas in this figure are those we've always used in our rural land market reports. Their boundaries and the 1995 sales summary statistics are shown in Figure 9.

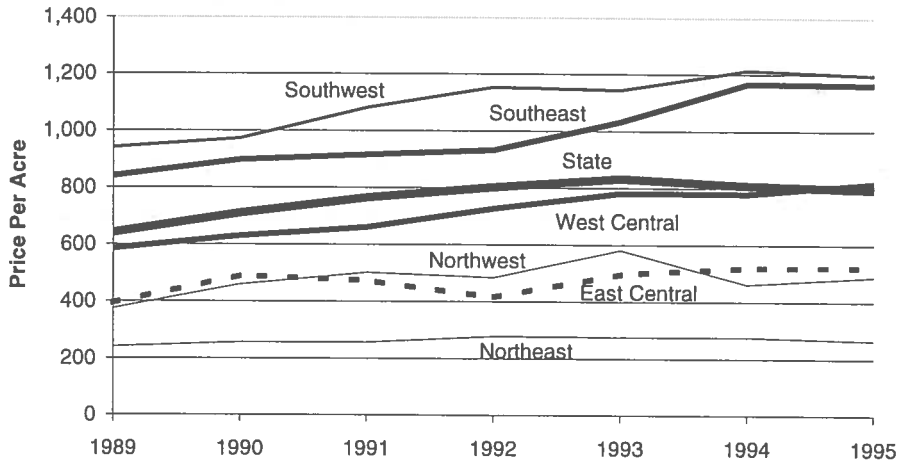
The principal reason that average prices declined slightly statewide but are flat or increasing in most reporting districts is what we might call the Problem of Composition. (Actually, like many problems, we can't do anything about it, so we should probably call it the Fact of Composition!)

One source of the Problem of Composition is the disparity of price levels across the state. In any given year, for example, the southwestern district reports average sale prices over twice as high as the northwest (and individual sales prices differ much more markedly). If proportionately more land is sold in a low-price district than in the previous year, it pulls the statewide average down.

Focus on the Northwest

Northwestern Minnesota provides an excellent example of the composition problem on a smaller scale. As we saw in Figure 8, the average price of land in that region has gone from $581 in 1993, to $462 in 1994, and then to $487 in 1995. Did the typical acre in that region really bounce around so much in value? Of course not. What really happened was a change in the composition of sales that lead to the calculation of those average prices.

Figure 8. Little Movement from 1994 Is Seen in Average Sales Prices Across the State



Analyzing the data: The basic data underlying the land sales report are available for readers' own analyses. The paucity of sales observations in any single year makes it hazardous to rely upon a single "average" to tell us much about the rural real estate market at any level more disaggregated than the county or even multi-county district. Readers are encouraged to try their own hands, however. Contact the managing editor at the address listed on the back page.

This is confirmed by Figure 10, which shows the distribution of 1995 sales inside and outside the Red River Valley. (I've defined the Valley here as those townships whose soils are predominantly floodplain or glacial lake bottom in origin. Think of them as the western halves of the counties along the Red River.)

There are clearly two different farmland markets operating in northwestern Minnesota, one inside the Valley and one outside. The average sale price inside for 1995 was $809, while outside it was $355. Combined, the two sets of sales average $487.

Why did the average price in the northwest as a whole drop so much in 1994? In part, this was because there happened to be so many more acres of the non-Valley (and, hence, less expensive) land sold that year compared to 1993. Over three times as much land from the non-Valley area was put onto the market in 1994, while the Valley showed only a 50% increase in sales volume (Figure 12). The weight of those non-Valley sales pulled the region's calculated average price way down from the previous year.

The other reason for the 1993-94 drop was the drop in Valley sales prices: the average fell from $912 to $783 in one year. This year, they edged upward again, as did the region as a whole. (Figure 13).

Figure 9. Recorded 1994 Farmland Sales Prices by Reporting District

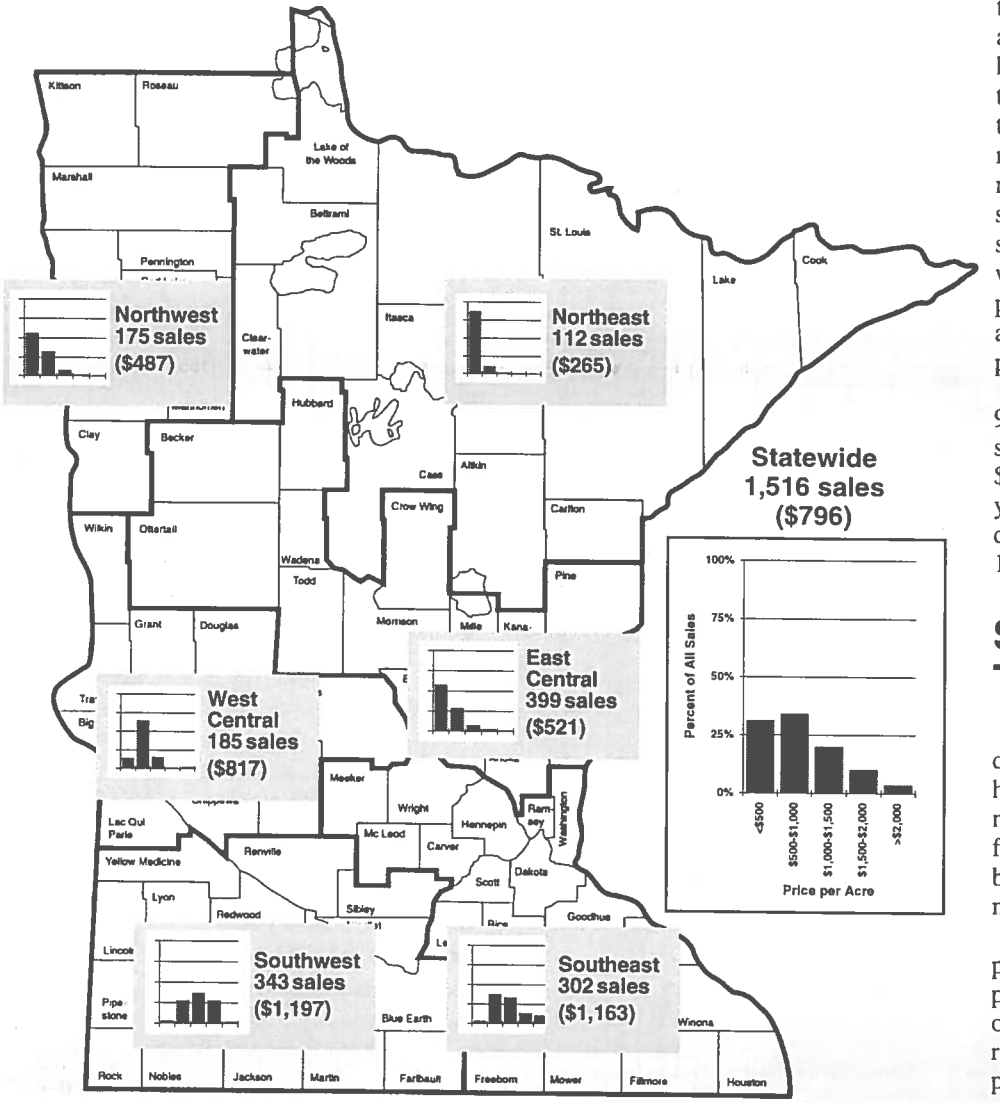
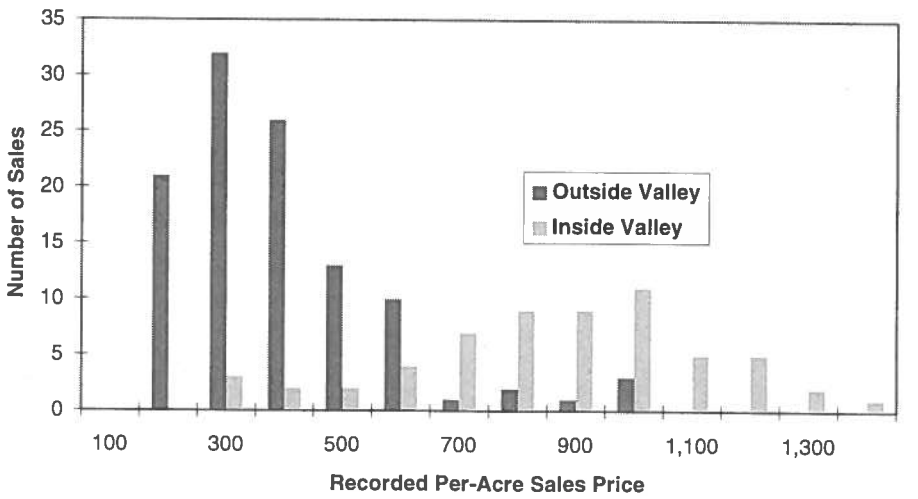


Figure 10. The Two Land Markets in Northwestern Minnesota



Some Parting Thoughts

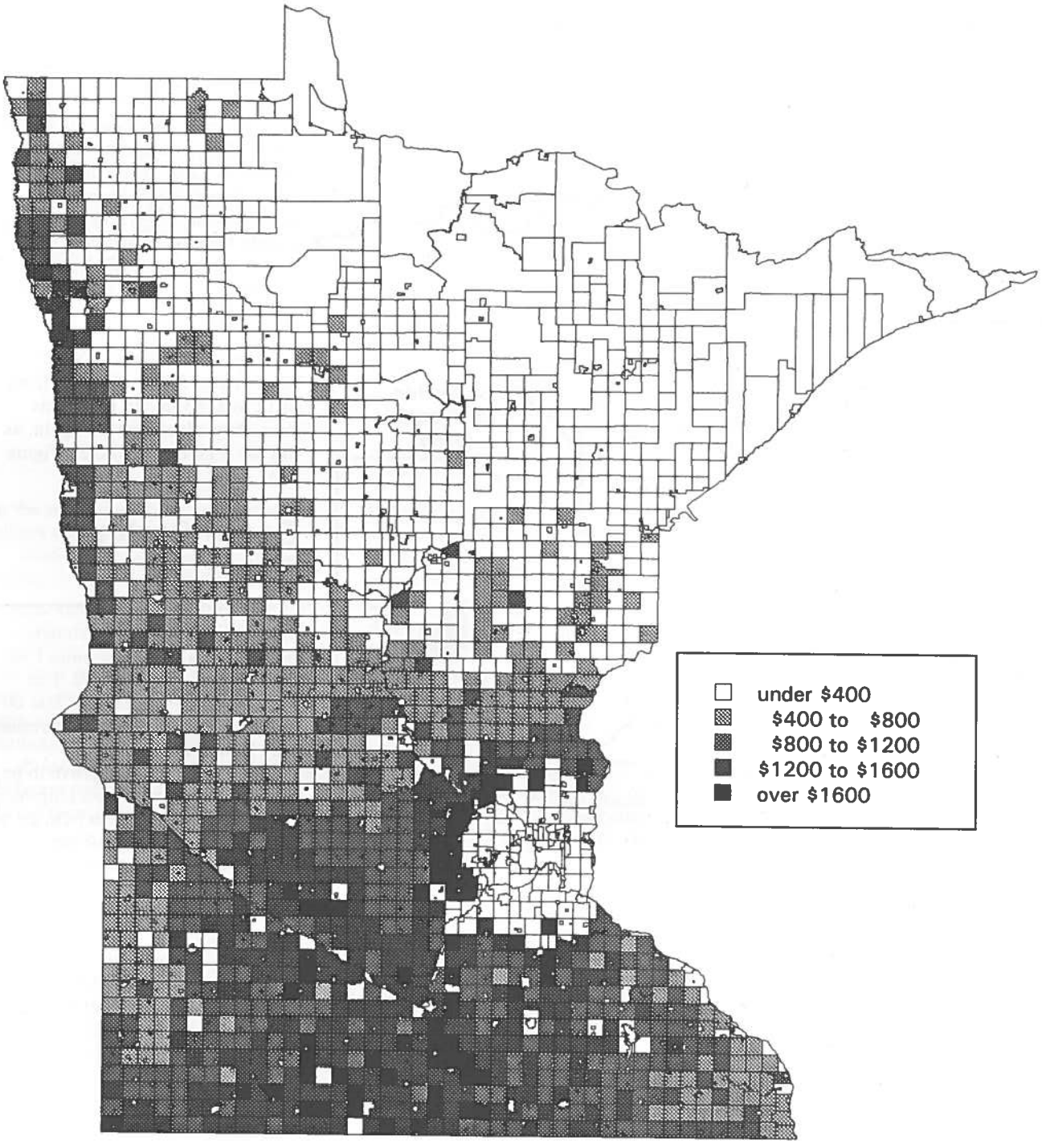
Looking at the farmland sales data from all the angles shown here, as well as several more I've not reported in this article, I'm forced to conclude that the late 80's bull market for Minnesota farmland may have run out of steam.

Will the 1993 high prove to be a peak, to be followed by a long-term plunge in average prices? Or are we on a plateau, waiting for the resumption of the steady (for the past decade) price rise? I have no scientific basis for an answer—but I do have opinions.

I think the general stagnation in sales prices reflects an underlying uncertainty about the future, an uncertainty held by both buyers and sellers of farmland. Many seem to think—as do I—that the present land price level is too high to be supported by present output price levels.

Conversations with farmers, real estate agents, and local land appraisers suggest to me that much of the price run-up in previous years can be attributed not to farmland's productivity, but rather to its location component. Neighboring farmers frequently dismember existing farms and pick up a 40

Figure 11. Township Average Farmland Sales Prices Since 1988 (Inflation Adjusted to 1995 Dollars Per Acre)



or an 80 to "round out" their own operations, making more efficient use of their current land and equipment holdings. A given parcel can be worth considerably more as an addition to an existing farm operation than it would be if it were forced to stand on its own.

The upward price pressures of these "cannibalization" opportunities are perhaps now being countered by potential buyers' increasing uncertainty about crop prices, crop subsidies, and government regulations.

Compared to its raw earning potential (from farming with no public subsidies), much Minnesota farmland is now overpriced. But compared to its value to neighboring operators—or, in some parts of the state, to buyers seeking recreational (e.g. hunting) opportunities—much of that land may be actually underpriced.

Current "stagnant" land sales prices may simply reflect the continued extreme variation in how Minnesota farmland is used now and in how people think it might be used in the future. Or perhaps the present (February 1995) higher grain prices may cause a shift in conditions, if farmers think the future earning power of land has improved as a result. Because the sales records used here stop at September 30, any recent run-up in land prices—if it exists—will not show up until next year's report. Stay tuned! □

Figure 12. Farmland Sales Volume in Northwestern Minnesota

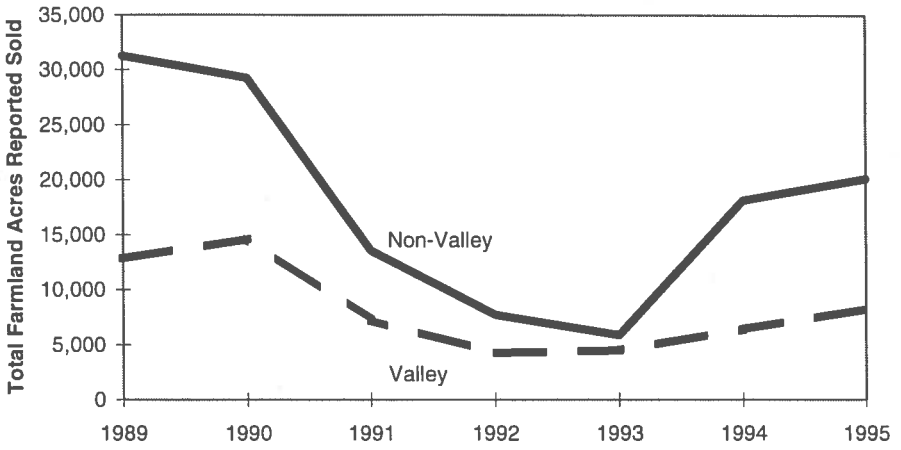
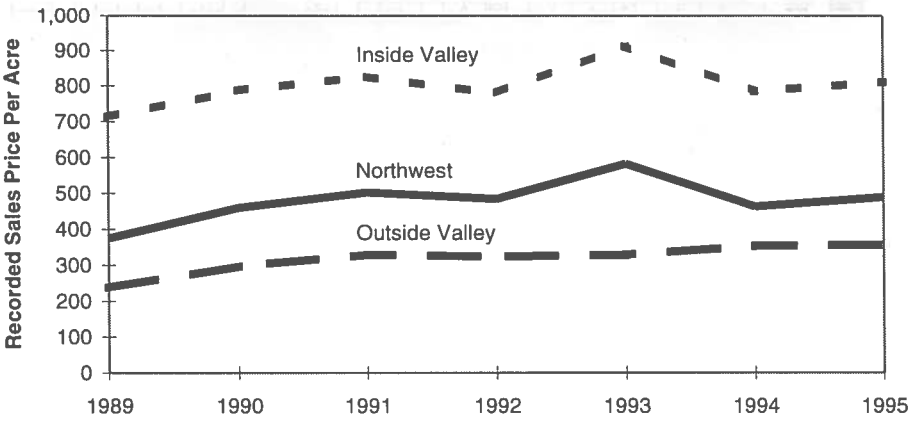


Figure 13. Price Movements in Northwestern Minnesota



*(**Grain** continued from page 1)*

Background

Equipment available for farmers moving grain both on the farm and from farm to market ranges from wagons to various types of trucks. Gravity wagons, hopper-bottom boxes mounted on a wagon frame and pulled by tractors or pickups, are common on many farms. They typically handle between 150 and 700 bushels of grain. Grain carts, used by some farmers to shuttle grain between the combine and a truck or gravity wagon, handle 400 to 800 bushels. Straight trucks used to haul grain typically have a capacity of 200 to 400 bushels, and tandem axle trucks handle between 400 and 600 bushels. Tractor trailer combinations (semis) are also used to haul grain and have capacities ranging to over 900 bushels.

We surveyed a random sample of Minnesota farmers in three crop reporting districts (the northwest, southwest, and southeast), to analyze the movement of their 1994 grain crops. The telephone survey was conducted by the Minnesota Agricultural Statistics Service. Eligibility was defined as a combined corn, soybean, wheat, and barley acreage greater than 120 acres. Useable data was obtained from 212 eligible farmers in the northwest, 229 in the southwest, and 210 in the southeast.

Because the farmers were selected randomly, the survey is a statistically valid representation of each area. However, this is not a "statewide" survey—results are only representative of each of the three areas. The areas were chosen to represent different types of agriculture and differing distances from the river and lake terminals.

In the northwest, wheat, barley, potatoes, and sugar beets dominate crop production, and there is very little animal agriculture. The distance to the Mississippi River ports and the port of Duluth/Superior exceeds 200 miles from all points in the district. The average size of respondents' farms was 1,239 acres.

The southwest area is one where corn and beans dominate crop production, and hogs are the most important livestock enterprise. The distance to Mississippi River ports is from 150 to 275 miles, and respondents averaged 565 acres in size. The southeast is a corn and soybean producing area where a variety of livestock enterprises, including hogs and dairy, are located. The entire region lies less than 120 miles from Mississippi River ports. The 210 respondents averaged 780 acres.

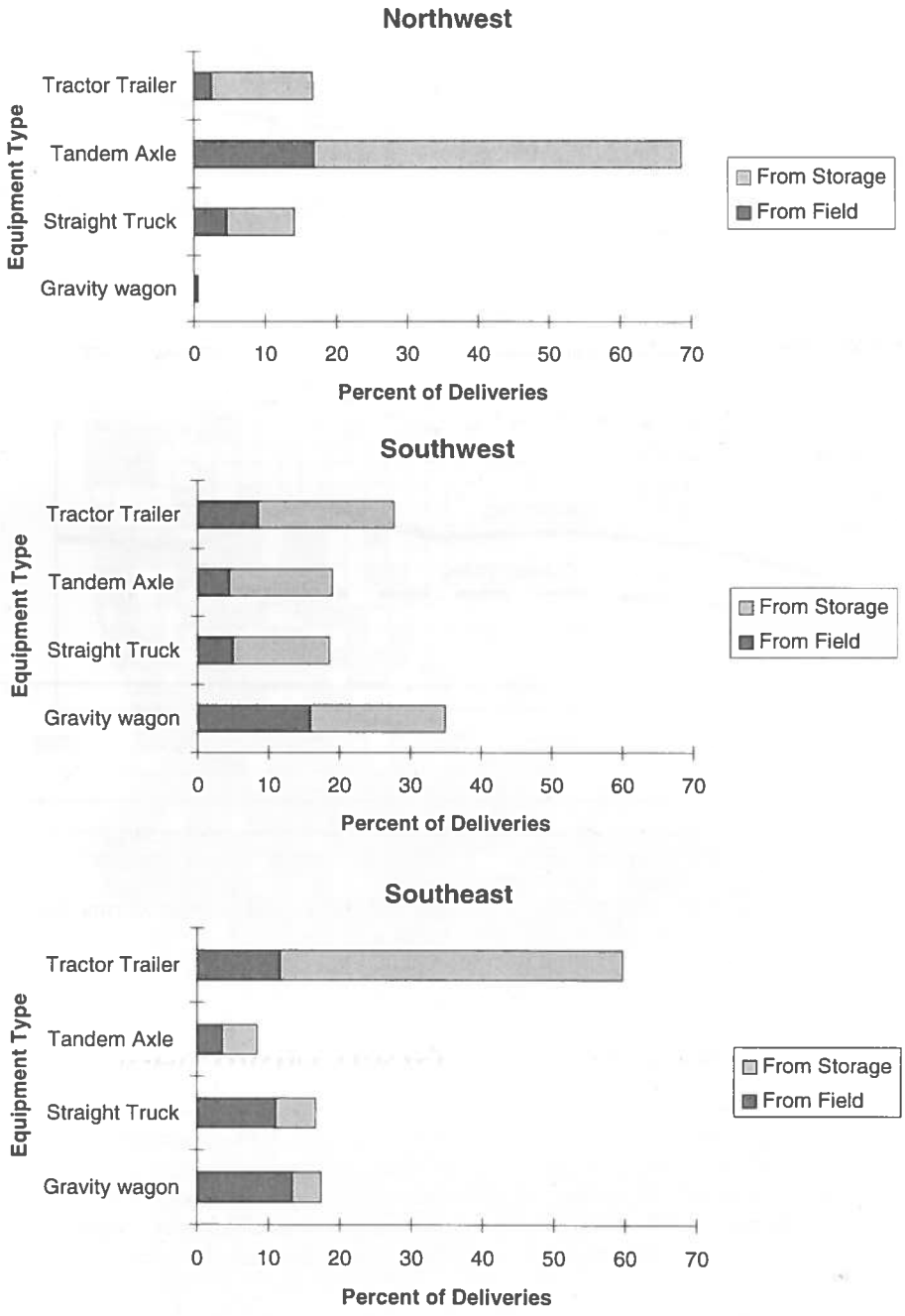
Equipment Used in Transporting Grain

There are significant differences in the equipment used to transport grain in the three crop reporting districts (Figure 1). In the northwest, the most common means of transporting grain is by tandem truck. In southwestern

Minnesota, gravity wagons are the most common way of transporting grain, while in the southeast, semis are predominant. In all areas, use of grain carts is confined to on-farm hauling. These are not shown in the figure.

The ownership of grain-hauling equipment reflects its use. This is illustrated in Table 1. In the northwest, there are many more tandem axle trucks as well as more straight trucks than there are in the southwest or the southeast. In fact, 30% of farmers surveyed in the northwest own at least three tandem trucks. In the southwest and southeast, more than one-third of the farms surveyed have at least four gravity wagons. Tandems are thus the most popular form of equipment for grain transportation in the wheat, barley, and sugar beet producing northwestern area of the state, while farmers in the corn and soybean producing southwestern and southeastern portions of the state use their gravity wagons for grain transportation. The ownership of tractor trailers for hauling grain is not concentrated in any of the crop reporting districts surveyed, although custom hauling in semis is very important in the southeast and is a factor in the southwest.

Figure 1. Seasonal Grain Transportation by Equipment Type



The ownership of grain hauling equipment is related to farm size. Farms in excess of 1,000 acres (23% of the respondents) owned 54% of the semis, 62% of the tandems, and 54% of the grain carts. Farms of less then 500 acres (45% of the respondents) owned 60% of the gravity wagons. The grain carts used in the northwest, where farm sizes are largest, have greater capacity than those in either the southwest or the southeast.

The equipment used in grain hauling also reflects different transportation patterns between harvest time and from storage throughout the year. Differences are shown for the three crop reporting districts in Figure 1. Only 24% of the grain was hauled out of the field at harvest time in the northwest, 34% in the southwest, and 40% from the southeast. The remainder was hauled from on-farm storage facilities at other times of the year. Most of the grain in the northwest is transported from storage by tandem axle truck. In the southwest, semis and gravity boxes are used about equally for transportation out of storage. In the southeast, tractor trailers predominate in hauling grain out of storage.

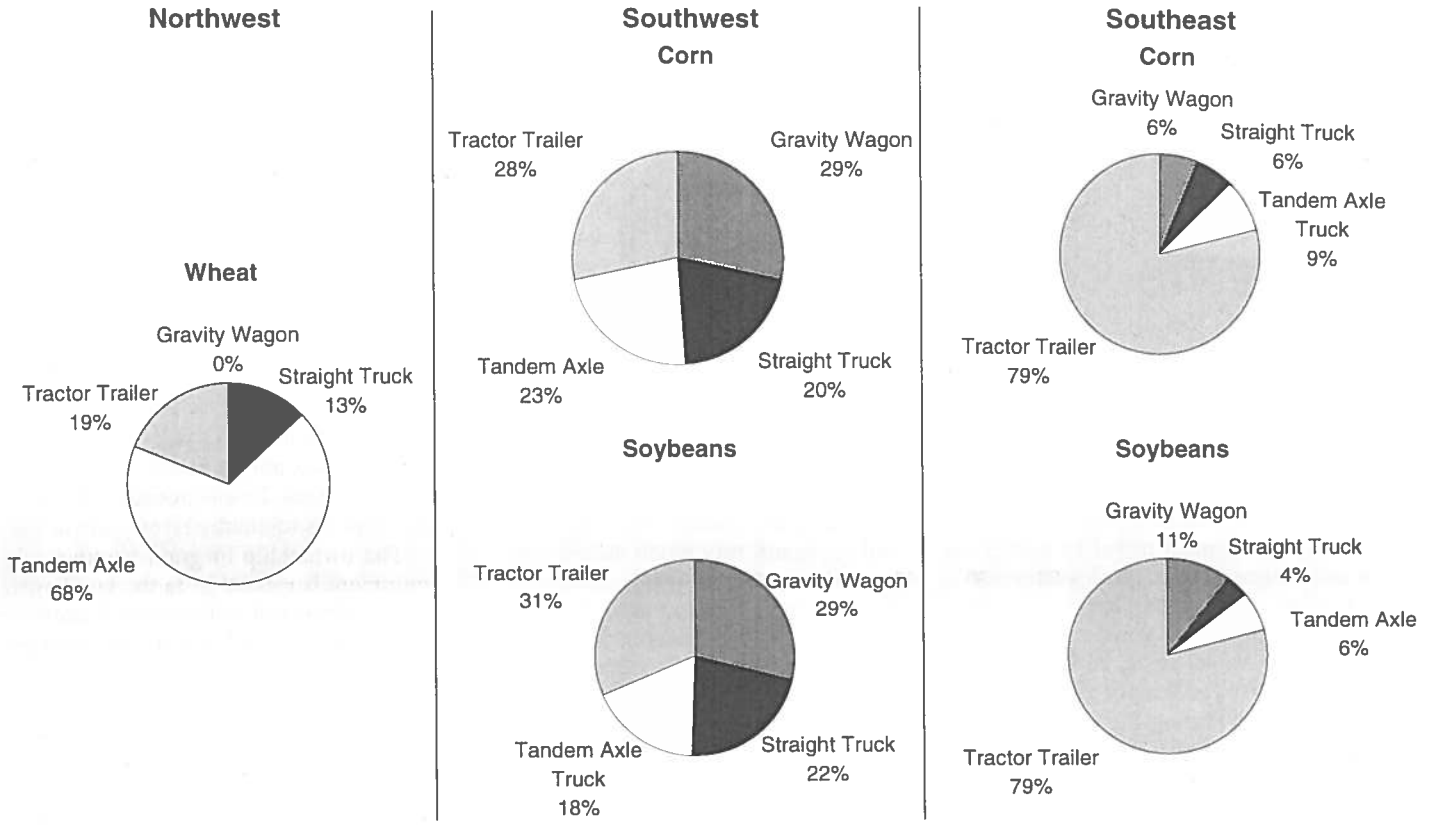
The type of equipment used to haul grain from storage varies by crop, as shown in Figure 2. The greatest use of tractor trailers is in the southeast. Gravity wagons are used extensively to haul out of storage, especially in the southwest. Farmers in the southwest are also large users of tractor trailers to haul corn and soybeans out of storage.

There are no major differences in the northwest when comparing out-of-the-field equipment use with that from storage. However, in the southwest gravity boxes are used more intensively out of field, and all three types of trucks are used less. Differences are most

Table 1. Grain Hauling Equipment and Average Capacity Owned by Sample Members

Type of Equipment	Northwest		Southwest		Southeast	
	Units	Capacity (Bushels)	Units	Capacity (Bushels)	Units	Capacity (Bushels)
Gravity Wagons	66	261	603	302	457	291
Grain Carts	22	613	11	561	17	487
Straight Trucks	158	331	115	343	120	336
Tandem Axle	327	541	66	542	39	544
Tractor Trailer Units	21	919	20	842	17	852

Figure 2. Equipment Used to Haul Grain from Storage, by Major Crop



pronounced in the southeast where both gravity boxes and straight trucks are used more extensively from storage while tractor trailers are used much less out of the field than from storage.

Custom hauling was done almost exclusively by tractor trailer. It accounted for only 6% of grain movement in the northwest and only 14% in the southwest, but custom haulers handled 43% of the southeast's grain shipments.

Transportation Distance and Road Surfaces

This study used three categories of rural roads: gravel (and dirt) roads, two-lane hard-surface roads, and multi-lane hard-surface roads.

Our survey showed that farmers in the three regions travel different average distances to transport their grain and that different types of equipment are being used for different length trips. Table 2 shows average distances by equipment type by road surface for the three survey areas. The greatest distance is traveled by tractor trailers in the northwest, most of it on two-lane hard-surface roads. Contrary to our expectations, the southwest had the smallest average distance traveled by tractor trailers, most of it also on two-lane hard-surfaced road. In the northwest and the southwest, tandem axle and straight trucks are operated over similar road types and distances. Gravity wagon trips average 5.4, 5.2, and 4.6 miles, respectively, about half of it over two-lane hard-surface road.

Since the different types of equipment have different carrying capacities per trip, we computed "bushel miles" by road type as well as average distances. Figure 3 shows that most of the bushel miles are over two-lane, hard-surface roads. The largest proportion of bushel miles moved on gravel roads is in the southwest.

We were also able to determine what proportion of grain is never hauled on gravel or dirt roads. In the northwest, 22% of the grain is never transported over such roads. In the southwest, 30% is not hauled on gravel roads, and in the southeast, 36%.

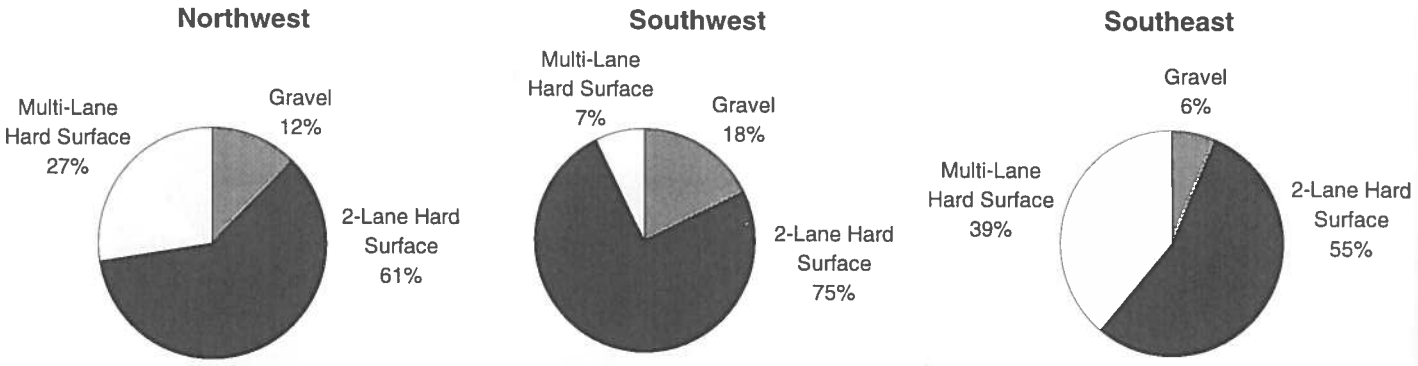
Constraints to Grain Movement

Nearly all farmers surveyed (97%) said they are affected by road restrictions

Table 2. Distances Traveled by Equipment, by Road Surface Type

District		Tractor Trailer	Tandem Axle	Straight Truck	Gravity Wagon
Northwest	Gravel	3.7	2.4	2.5	2.9
	2-lane hard surface	47.5	6.2	5.2	2.2
	Multi-lane hard surface	32.2	.6	.8	0
	Total	**83.4**	**9.2**	**8.5**	**5.1**
Southwest	Gravel	1.40	2.0	2.6	2.1
	2-lane hard surface	17.3	6.2	6.7	2.9
	Multi-lane hard surface	2.1	.5	.2	.2
	Total	**20.8**	**8.7**	**9.5**	**5.2**
Southeast	Gravel	1.4	.3	1.9	1.6
	2-lane hard surface	17.8	12.2	6.6	2.9
	Multi-lane hard surface	15.2	1.2	.9	.1
	Total	**34.4**	**13.7**	**9.4**	**4.6**

Figure 3. Proportion of Bushel-Miles, by Type of Road, by District



at some point. Of those affected by spring road restrictions, 92% do not have alternate routes to market. Of farmers with alternate routes, those in the northwest must travel an additional 6 miles, those in the southwest travel an additional 5 miles, and those in the southeast an extra 11 miles. To avoid these extra travel costs, 76% of the farmers surveyed simply avoid transporting grain during the spring restrictions period.

Physical constraints to grain movement such as bridge restrictions do not affect most of the farmers surveyed. Only 2% reported facing such physical constraints in delivering grain to market. The additional distance required to avoid physical constraints varies by the level of the marketing chain to which grain is delivered. The additional distance was the least for delivery to local elevators, and greatest for delivery to terminal elevators and processors.

Equipment Purchase Plans

Farmers were asked about plans to purchase additional grain hauling equipment (Figure 4). The proportion of planned purchases for tractor trailers was equivalent to 60% of the respondents' current inventory. Plans to purchase tandem axle trucks is 18% of the 1994 inventory, and plans to purchase grain carts equals 26% of the existing stock. As a proportion, plans for purchasing straight trucks and gravity wagons are much lower, equaling 7% and 9% of the 1994 inventory.

Our Observations

Grain transportation practices differ greatly by region. Farmers in the northwest, characterized by Red River agriculture, rely heavily on tandem axle trucks. Farmers in the southwest and the southeast, characterized by corn and soybeans, rely much more on gravity wagons and semis. Larger capacity grain hauling equipment is correlated with increasing farm size.

Some of our results surprised us. We expected to find an increased use of semis for long distance hauls to terminal elevators the further the area was from Duluth-Superior and Mississippi River ports. Instead we found the highest proportion of semi use not in the northwest or the southwest but in the southeast near the Mississippi River.

We expected to find trucks and semis used to move most grain out of storage, but instead we found substantial use of gravity wagons for the purpose, especially in the southwest.

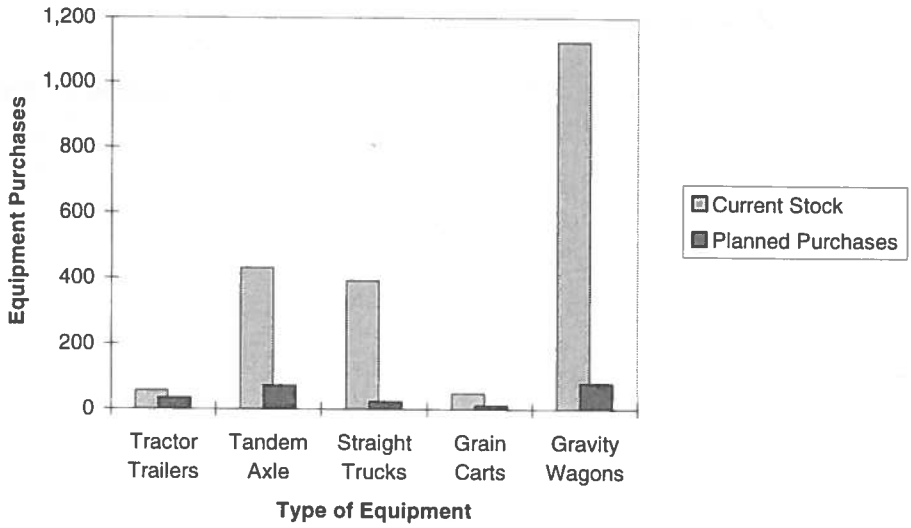
A relatively small proportion of "bushel miles" are hauled to market on gravel or dirt roads in either of the southern areas. Over half of the bushel miles in each area are on two-lane, hard-surface roads. In the southeast and the northwest, 38% and 27% of the bushel miles are on multi-lane, hard-surface roads. This is because of large movements to nearby river ports in the southeast and the longer distance hauls to Duluth-Superior from the northwest.

A substantial proportion of grain is never hauled on gravel or dirt roads but leaves the farm on a paved road.

Custom hauling varies in importance between regions ranging from 5% in the northwest where farmer-owned tandems are the dominant mode, to 43% in the southeast where semis are the dominant transportation mode.

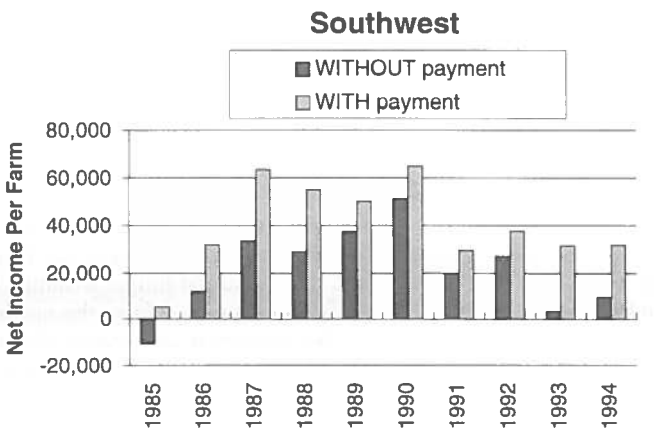
Of course, these results and conclusions must be interpreted with caution. This study covered only the 1994-95 crop year, and as such, will not incorporate price effects that alter grain marketing decisions. Farm-to-market grain flow transportation patterns and equipment use undoubtedly vary substantially from year to year. However, this research provides some answers and insights on "how farmers get their grain to town."□

Figure 4. Planned Equipment Purchases and Equipment Owned in 1994

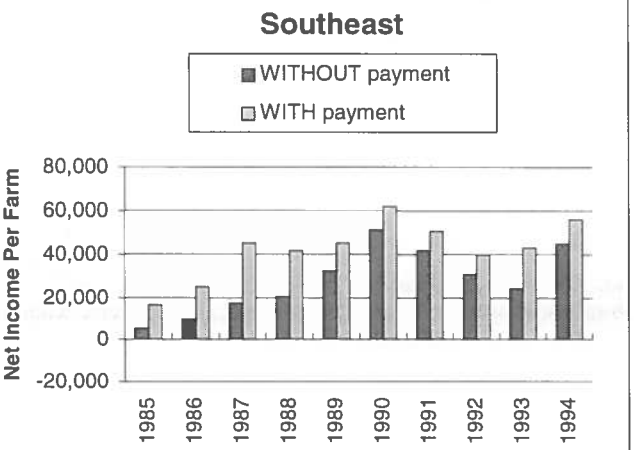


Effect of Government Payments on Net Farm Income

What might happen if the federal government no longer subsidized crop production in Minnesota? (Not that this will happen in the near future, mind you.) These averages from two farm business management associations show that in some years, crop subsidies have been sizeable parts of net farm income.



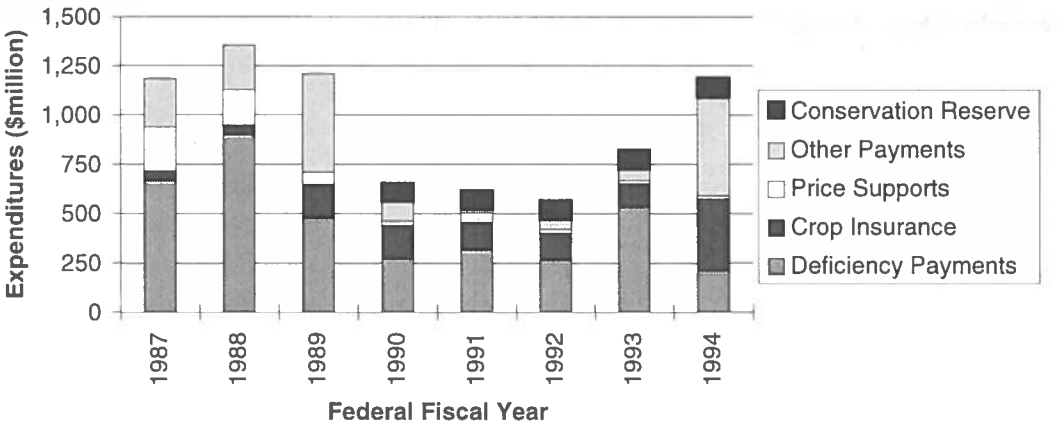
Source: Southwestern Minnesota Farm Business Management Association



Source: Southwestern Minnesota Farm Business Management Association

Federal Crop Program Expenditures in Minnesota

The ongoing debate over federal budget priorities frequently touches on federal farm programs—the "Farm Bill." Just how big is it? Here are the last several years' summaries of crop-related expenditures in Minnesota. Absent from these figures are certain noncrop expenditures funded under the Farm Bill; notably, food stamps and related nutrition programs.



Source: United States Department of Commerce

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