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## The Current Minnesota Farm Situation

### Editor's Note

The dramatic downturn in many crop and livestock prices this fall has prompted much public concern for the condition of farmers and rural economies in the state. Several members of the Department of Applied Economics have written recently on the situation. Their thinking is compiled in a series of research papers, available from Waite Library (see page 8) or on the web at [www.cffm.umn.edu/cffm/farmsit.htm](http://www.cffm.umn.edu/cffm/farmsit.htm). In this issue, starting on page 3, four of these papers are summarized to give you a quick overview of how the price declines might affect farming in Minnesota. For details on estimation procedures, price histories, and market projections, please turn to the full reports.

## Estimating the Size of the Soybean Industry in Minnesota

George W. Morse

By any measure, Minnesota's soybean industry is big. In 1996 soybeans were grown on 5.9 million acres and produced 224.2 million bushels. At an average price of \$6.75/bu, the farm value of the state's production in 1996 amounted to \$1.5 billion.

Soybean sales accounted for 16 percent of the state's total farm output in 1996 (figure 1). Production is evenly spread throughout most of the state's agricultural regions—roughly one-quarter of the total is produced in each of the southwest, south-central, west-central, and southeast regions.

Soybeans and soybean products are Minnesota's second largest agricultural export to foreign countries, accounting for 28 percent of the state's total foreign agricultural exports in 1996. Foreign exports, however, are not the principal destination for soybean exports from Minnesota. "Domestic exports," or sales to other states, accounted for about 67 percent of the total in 1994. Soybeans rank fourth and account for 12.8 percent of all agricultural exports and 2.5 percent of all exports from the state (table 1).

Figure 2 shows sales of soybeans and sales by soybean processors to major types of customers. About a third of the

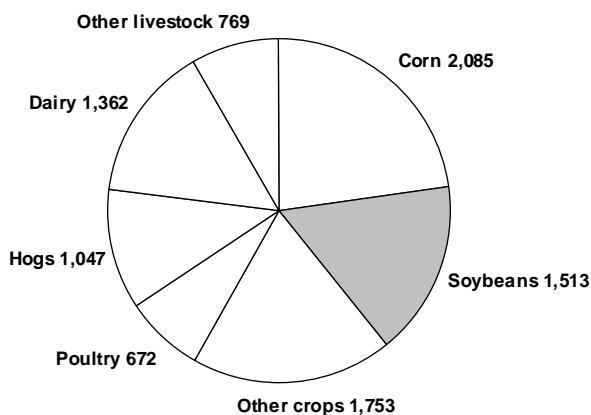
soybeans are sold to processors within Minnesota and another 15 percent go to other types of processors such as vegetable oil mills, food processors, confectionery products, salted and roasted nuts and seeds, and wet corn milling. Forty-seven percent of the soybeans grown in Minnesota are exported to other states or to other nations.

### Impact Analysis

Linkages between the soybean production and processing industries and the rest of Minnesota's economy mean that the soybean industry impacts employees of all kinds across the state. Input-output analysis is used widely for examining the importance of such linkages to other parts of the economy. I used such a model to develop the estimates reported here for soybeans. If you'd like more details on the model, check the report on the poultry industry that I prepared for the previous issue of

(See *Estimating Size*, page 2)

Figure 1. Soybean's place in Minnesota agriculture (million dollars)



the Minnesota Agricultural Economist ([www.extension.umn.edu/Documents/F/L/Other/ag237-693a.html](http://www.extension.umn.edu/Documents/F/L/Other/ag237-693a.html)) or ask for the full soybean report from Waite Library (address on page 8).

A basic assumption in input-output models is that the economic structure and purchasing patterns of the studied industries have not changed in a major way since 1994. The IMPLAN data and structure for 1994 were used as the basis for the estimates that follow.

### Employment Impacts

Minnesota's soybean industry employed 22,738 people in 1996, with 22,300 jobs in farm-level production and 438 in processing plants. The production jobs include both full- and part-time jobs. On average, each soybean production worker devotes 31.8 percent of a full-time equivalent (661 hours/year) to growing soybeans. Thus, the 22,300 jobs in soybean production are equivalent to 7,094 full-time equivalent jobs. These jobs, however, are less than 65 percent of the 35,178 jobs that depend on the soybean production and processing industries.

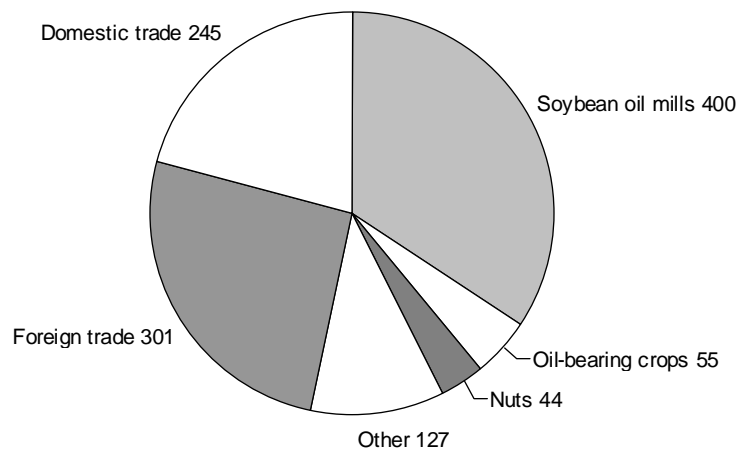
Figure 3 shows the distribution of jobs attributed to soybean production, soybean processing, suppliers, and employee spending. Soybean producers account for 63 percent of the jobs, while processors account for only 1 percent. In addition, there are 12,451 jobs outside the soybean industry that depend directly on soybean processing plants and soybean production. These include those firms and jobs that provide processors and producers of soybeans with the goods and services they need in order to produce their products; firms that provide goods and services to the employees of the soybean producers; and the suppliers for these two.

Each of the direct suppliers depends on other firms for inputs. The inputs and related jobs needed to support the direct suppliers are also counted. These linkages are traced back until all of the jobs that depend on soybean production and processing are counted. Such jobs account for 21 percent of the total jobs depending on the soybean industry. Employee spending-related jobs, which account for 14 percent of all soybean-related jobs, are those that depend on the

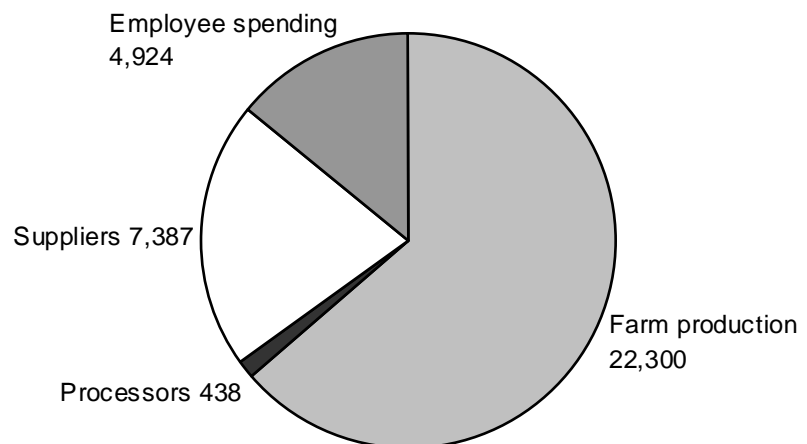
**Table 1. Foreign and domestic exports of agricultural products, Minnesota: 1994**

Agricultural sector	Millions of dollars		
	Sales to other countries	Sales to other states	Total exports
Food grains and products	221.9	2,395.6	2,617.6
Dairy products	87.3	1,619.8	1,707.1
Live animals and meat	195.0	1,113.5	1,308.5
Soybeans and products	375.1	832.5	1,207.6
Feeds and fodder	410.7	708.1	1,118.7
Sugar beets	24.8	394.5	419.3
Fruits and vegetables	140.6	188.1	328.7
Poultry products	48.5	180.7	229.2

**Figure 2. Minnesota soybean sales by destination (million dollars)**



**Figure 3. Jobs depending on Minnesota soybean industry**



spending of all the employees and farmers working directly in the industry as well as those working in the supplier industries.

In total, 411 sectors, or 89 percent of all sectors in the Minnesota economy, depend to some degree on the soybean industry. The employment impacts for many of these sectors are very small: 300 of the sectors account for fewer than 10 employees. On the other hand, 28 sectors employ over 100 people whose jobs depend on the soybean industry.

### Income Impacts

In 1996 the soybean industry added \$1.6 billion to Minnesota's economy. This income includes the wages and salaries of employees, the earnings of self-employed persons, company profits or losses, rental income, interest, and sales taxes. Sixty-four percent came from soybean production and another 2 percent from soybean processors. In total, these industries earned \$376.7 million as a result of supplying the industry. The finance, insurance, and real estate sector earned 34 percent of the total. While not identical, the value-added income due to employee spending follows a similar pattern to the suppliers.

### Impact Comparisons

While soybean producers account for nearly 33 percent of those whose jobs depend on soybeans, they earn less than half of the income coming from soybeans. In large part this reflects the fact that the 22,300 people in Minnesota who grow soybeans only spend a third of their time actually raising soybeans.

In contrast, 1.2 percent of the jobs in soybean processing account for over 18 percent of the income earned (table 2). The much higher ratio of income to employment for soybean processors reflects the fact that my definition of income includes returns to capital and not just employee income.

Slightly over 1 percent of the state's total jobs and income come from the jobs dependent on soybean production. While soybeans are very important to the state, they are but one sector of a very diverse economy.

**Table 2. Soybean employment and income impacts in Minnesota: 1996**

Industry	Millions of dollars	
	Employment	Income
Soybean production	63.4	48.2
Soybean processing	1.2	18.1
FIRE*	6.6	11.1
Manufacturing	2.8	5.0
Services	9.0	4.8
Trade	7.3	4.4
Construction	4.0	4.2
TCPU**	2.2	2.8
Other agriculture	3.1	1.0
Government	0.4	0.4

\* Finance, insurance, and real estate

\*\* Transportation, communications, and public utilities

## Cropland Rents

### Bill Lazarus

How will the rental market for Minnesota cropland be affected by corn and soybean prices 25 to 30 percent lower than a year ago? Data from past years suggest that cash rents will adjust over time, but adjustments will be small compared to the expected changes in profitability. Average rents do rise and fall over the years. Figure 4 summarizes an annual statewide survey conducted by the USDA in which randomly selected farmers are asked what cash rents they expect to pay during the current year. In addition, the figure plots the actual rents paid by members of the Southwestern Minnesota Farm Business Management Association. The two rent estimates track fairly closely, with the Association rates averaging 25 percent higher than the statewide average.

In this article, I use FAIRRENT, a computer software package available through the Center for Farm Financial Management at the University of Minnesota, to calculate a "break-even rental rate." The break-even rental rate is the amount a tenant could pay for land rent after all other expected expenses and revenues are considered.

In 1997 it cost \$322 to grow a typical acre of corn on rented land in southwestern Minnesota. Land rent amounted to \$90 or 28 percent of the total cost. This amount, however, does not include either cash for family living expenses or the renter's "opportunity cost," that is, what the renter could have earned in other employment. When opportunity costs are added in, the total cost of growing an acre of corn on rented land is \$349 per acre, which is \$9 more than gross returns. This means that the average tenant came up short of covering the rent and other expenses—including opportunity costs. And this was for 1997, a good year.

The situation in 1998 looks much worse than 1997. At projected 1998 prices and yields, the amount remaining for rent for a corn-soybean rotation drops from \$95/acre to \$53 (figure 5). Returns were sufficient to pay the following year's rents in only 10 of the 15 years for which data are available, so 1998 would not be an atypical year in that respect.

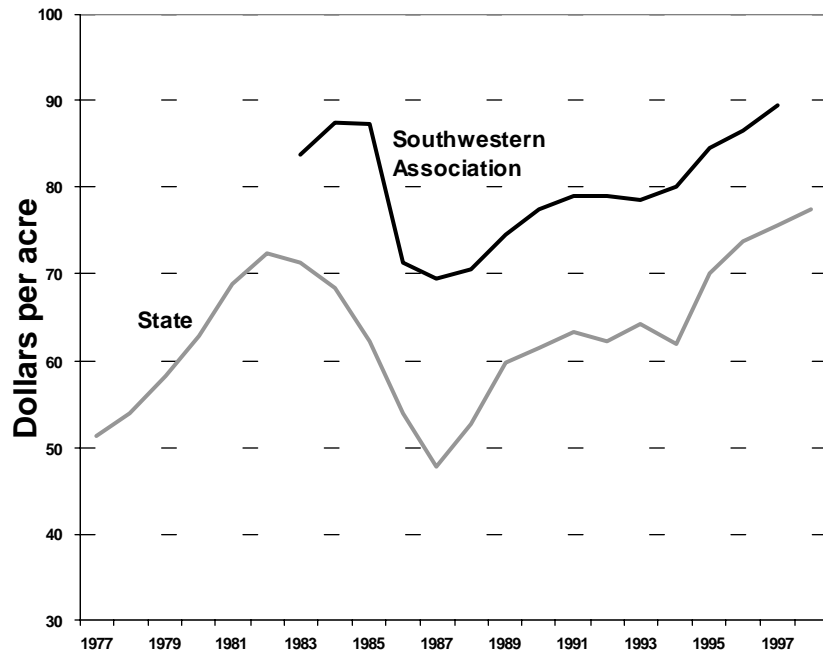
What does this tell us about where rents will head in 1999? The crystal ball is pretty cloudy, but historical trends

(See *Cropland Rents*, page 4)

suggest that rates might decline slightly this year. However, it may take another year or two of financial stress before substantial declines are seen.

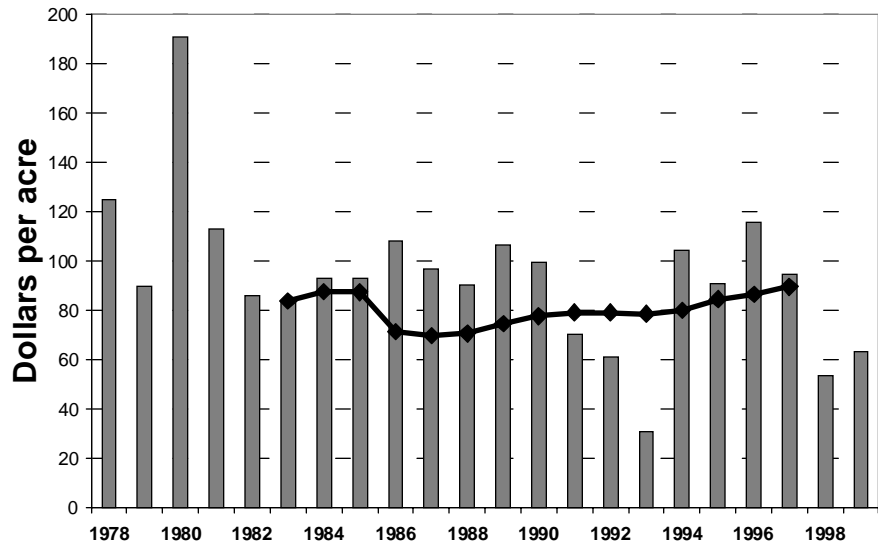
The long-term outlook appears a little better than the projection for 1999, but it looks as though some degree of downward adjustment in rents will be needed if tenants are to cover their costs. In a down year, some tenants with low debt may be willing to forgo covering some overhead expenses in order to maintain control of their rented acreage for the better years to come rather than lose it to other bidders. Machinery and building replacement costs are the expense most likely to be postponed. Also, some tenants may be willing to accept less than the opportunity cost I used in my estimates—especially if the difference can be made up with off-farm income, other farm enterprises, or plain old belt-tightening.

Figure 4. Average farmland rents in Minnesota



Source: USDA and SWFBMA

Figure 5. Calculated break-even rent per acre (bars) and actual rents paid (line), Southwestern Association



Source: SWFBMA and author's calculations

# Farm Income

Kent Olson

This fall's low prices are putting tremendous downward pressure on farm income in 1998 and into 1999. The impact, however, won't be uniform throughout the state. For some cropping operations, income is expected to fall to extremely low levels. Other farms, especially dairy farms, will not experience these low incomes and may, in fact, do quite well.

Farming has always been a risky business. Riskiness is not just due to varying yields and prices but also depends on the type of farm and the management choices of the farm operators. This riskiness—and the effect of the types of farms involved—can be seen by looking at the income trends of two groups of farms: the Southwestern

and the Southeastern Minnesota farm business management associations.

From 1978 through 1997, the average farm in the Southwestern Association experienced a wide range of accrual net farm income (figure 6). Note that "accrual net income" provides a more accurate estimate of the current year's income than other methods because it accounts for changes in inventory levels. From 1978 to 1997, accrual net farm income ranged from a low of \$2,272 in 1981 to a high of \$65,004 in 1990. (These figures are not adjusted for inflation.) In addition, income was greater than \$50,000 seven times and less than \$25,000 three times. Although individual farms in the Southwestern Association have suffered negative incomes, the *average* income for all farms has never been negative.

In the Southeastern Association during the same 20 years, the average farm experienced a similar wide range of

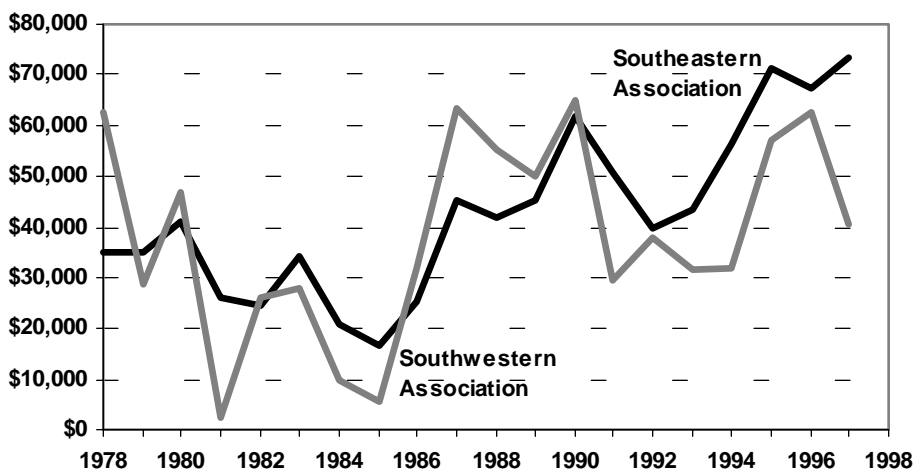
accrual net farm income, but the range was smaller. From 1978 to 1997, average income in the Southeastern Association was greater than \$50,000 six times and less than \$25,000 only twice. Again, the *average* income for all farms has never been negative.

To estimate the impact of this fall's low prices on 1998 farm income, I adjusted the 1997 average income statements for each association by estimated changes in prices, yields, and government payments. All other variables, such as crop acreages, numbers of livestock, production methods, and so on, were assumed to remain at 1997 levels. This simple method does not reflect the complexity of farmers' decision making and the differences in the economic conditions between 1997 and 1998, but it does provide an early alert on probable magnitudes.

The estimated 1998 accrual net farm income for the average member of the Southwestern Association is *minus* \$16,229 (table 3) in comparison to \$40,598 for 1997. This estimate is not as low as the one I issued in August—the present estimate reflects recent Congressional action—but it still would be the first negative average in the 59-year history of the Association.

Following the same procedures, the estimated accrual net farm income in 1998 for the average member of the Southeastern Association is \$54,863, a decrease of 25 percent from the record set in 1997. Estimated income is higher for this Association because it has a much higher proportion of dairy farms among its members, and these farmers presently enjoy high milk prices, low feed prices, and increased government assistance.

Figure 6. Average accrual net farm income through 1997



Source: SWFBMA, SEFBMA

Table 3. Estimated 1998 average farm income for two farm management associations

	South western		South eastern	
	1997	1998	1997	1998
Gross farm income (\$)	359,710	312,107	294,687	303,108
Net cash income (\$)	56,469	19,006	69,186	81,407
Accrual net farm income (\$)	40,598	-16,229	73,312	54,863

# Corn Prices

Stanley C. Stevens

The fall of 1994 marked the beginning of a four-year cycle in Midwest corn markets. In this article I trace the market-making events behind the Boom, when corn prices rose to historic highs in the spring of 1996, and the inevitable Bust that followed.

Over the past 10 years, “official” corn prices have for the most part hovered around \$2.50/bu (figure 7). In rural Minnesota, however, the price is usually 20 to 50 cents less because of added transportation costs. Prices generally rise above this basic level when corn ending stocks (the amount of corn in the nation’s inventory just before a new crop is harvested) are projected to fall below one billion bushels.

In 1994 the nation’s corn crop was a 10 billion-bushel bin buster, leading USDA analysts to project ending stocks at a comfortable 1.8 billion bushels. Eyeing this, some analysts suggested that prices would remain low for some time. In early December of that year, however, China—to fight inflation fueled by domestic grain shortages—announced it would stop exporting corn and would instead increase imports. This was in marked contrast to the previous four years when China had expanded its corn exports to about 300 million

bushels per year.

Getting the Chinese market back was good news for U.S. exporters. U.S. corn prices started rising in response. Indeed, some analysts thought the U.S. was entering a New Era in which the emerging Chinese market would drive corn prices even higher. But a closer examination of China’s demand for corn would have shown that the country’s maximum import requirement was only some 400 million bushels per year, roughly 4 percent of U.S. production. Moreover, production of corn in China was expanding as yields improved.

Despite these concerns, U.S. corn

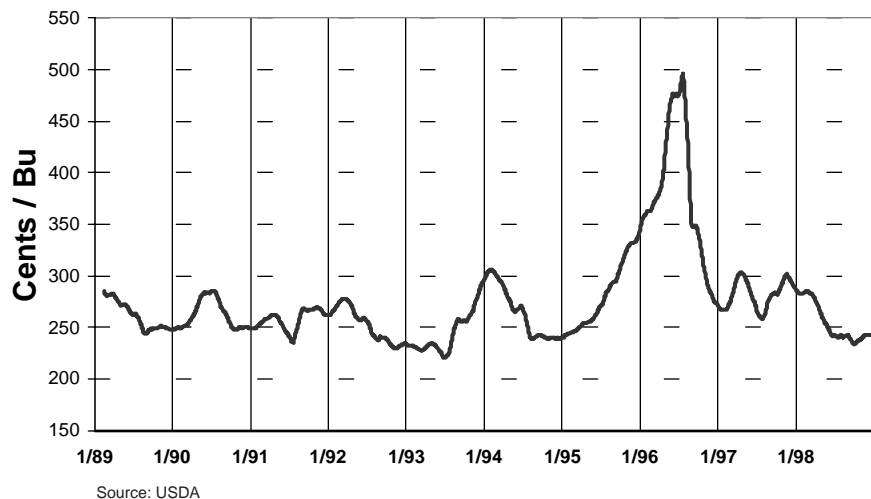
prices continued to move higher during 1995. This reinforced the view that a New Era had indeed arrived.

But, the real reason corn prices continued to move higher in the second half of 1995 was that corn was becoming scarce. In 1995 the U.S. crop was 2.7 billion bushels lower than the record 1994 crop. Corn was scarce once again, and prices moved to match this scarcity. By the spring of 1996, corn prices reached over five dollars per bushel.

Recent price movements have been tied more clearly to U.S. production than

(See *Corn Prices*, page 7)

Figure 7. U.S. corn price movements (July futures)



# Livestock Prices

Brian Buhr

Like most commodity sectors, livestock and meat prices have been falling for many months.

While hog prices currently are low (weekly averages have been near \$30/cwt since Labor Day), they were higher than average in 1996 and 1997 (figure 8). As of September 1, 1998 breeding herd inventories were equal to one year ago—so I would expect the expansion in market hogs to eventually cease as well.

Although the inventory levels provide insight into expected future production, actual meat supplies also depend on slaughter weights, cold

storage stocks, and trade of both live animals and meat. Current expectations are that the first year-to-year decline in hog production will not occur until the last quarter of 1999. Producers may be slower to respond to unfavorable hog prices because of very low priced feed.

In contrast, beef prices have remained below average for over two years (figure 9). This is because cattle cycle inventories peaked in 1996 and production has been high since mid-decade. Slow sales of feeder cattle and cattle on feed, a slump in exports to Asian markets, and dramatically higher pork production have resulted in lower beef prices in 1998. Currently, it appears that sustained, higher prices will have to wait until 1999 when cattle feeders slaughter their heavier weight cattle, which are now clogging the beef-production pipeline.

For both cattle and hogs, the greatest single cost item is feed. Improved feed performance can be used to minimize costs, but high feed grain and soymeal prices can destroy even the best feeding program. In 1996, feed grain and soymeal prices were extraordinarily high but moderated in 1997. This year, of course, feed prices are quite low.

Cattle and hog prices exhibit predictable cycles over multiple years that make long-term price and production predictions somewhat easier than grains where year-to-year variation is more directly at the mercy of hard-to-predict weather events.

Since the mid-1970s, cattle inventories have been on a downward trend. However, cycles still persist. The peak

(See *Livestock Prices*, page 7)

in cattle inventories occurred in 1996 and prices still remain low because it takes at least 18–24 months to move the higher calf supplies resulting from the peak through the beef market pipeline.

Hog cycles are much shorter than cattle cycles and last about four years. The latest peak in production occurred in late 1994, and the current 1998 peak suggests that production will decline over the next few years.

Open-market transactions are increasingly being replaced by pre-established contracts for the exchange of both cattle and hogs. Contracts serve the important role of providing stable supplies in markets where it is sometimes difficult to predict future supply-and-demand conditions that may be out of the direct control of all participants in the contract. In addition, contracts can promote efficiency in markets.

But as with most economic transactions, there are risks associated with contracting. The most obvious is that a contract may oblige one or other of the parties involved to accept unfavorable terms. Another problem arises when one particular buyer or seller controls a large share of the market. This buyer or seller may be in a position to offer unfavorable “take-it-or-leave-it” terms to all the other parties.

Perhaps less intuitive is the fact that contracts might influence market conditions. As more hogs or cattle become contracted at pre-determined prices, the number and quality of animals available to determine the open market price also changes and may begin to affect the behavior of market-determined prices.

Contracts can help identify and transfer products with higher or specific quality characteristics and help reduce the risk of exposure to short-term market fluctuations. However, poorly written contracts can actually increase risk. Long-term contracts can be particularly risky because uncertainty naturally increases further into the future.

Figure 8. U.S. hog prices (left scale) and production (right scale)

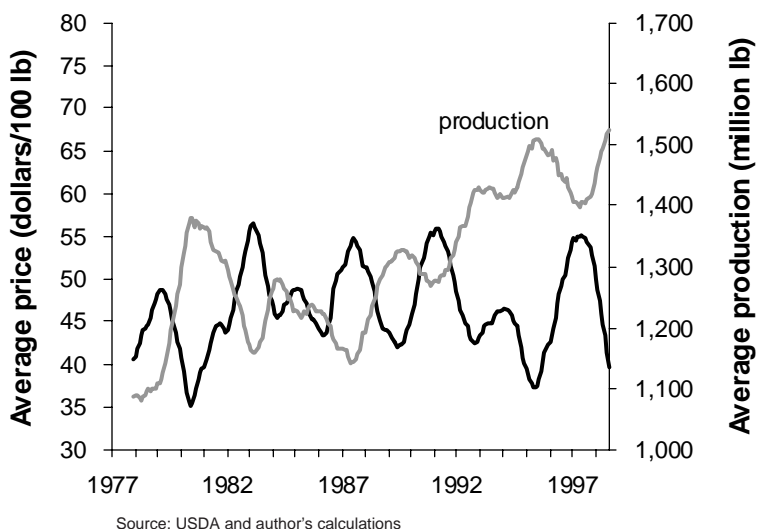
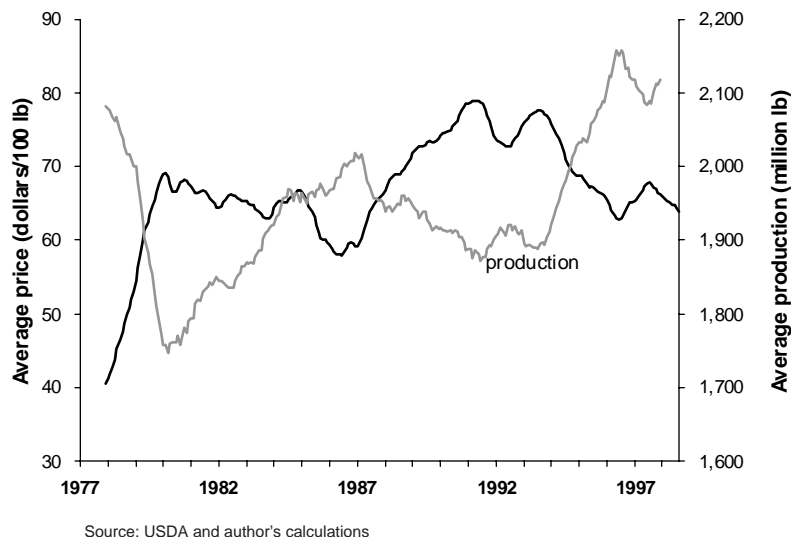


Figure 9. U.S. cattle prices (left scale) and production (right scale)



Corn Prices, continued from page 6

to export demand. Over the past 30 years, about two out of three U.S. corn crops have been rated either good or excellent. But in 1991 there was a drought in the eastern Corn Belt. In 1993 heavy rains in the Midwest were very damaging to crops. In 1995 a combination of late planting, summer heat, corn borer damage, and localized droughts reduced yields.

In contrast, the 1996, 1997, and 1998 crops were reasonably good. Just as a series of poor crops in the past was the real reason for a short period of very high prices, the latest run of good crops largely explains why prices have

declined recently. Fall 1998 ending stock projections and corn prices are both about where they were in 1994.

The current low prices for corn are likely to persist until something threatens to shrink projected ending stocks to less than a billion bushels. In the near term, corn prices are likely to stay low because of flat world demand. If the La Nina weather event reduces corn yields in 1999, as some agronomists predict, the current comfortable ending stock projections may not buffer a corn shortfall in 1999. Prices might rise once again in response.



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