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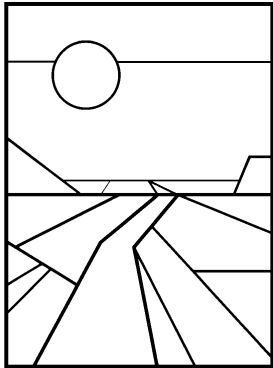
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PURDUE AGRICULTURAL ECONOMICS REPORT

SEPTEMBER 1999

Indiana Land Values Decline

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The 1999 Purdue Land Values Survey indicates that the value of an acre of average bare Indiana cropland was \$2,092 per acre in June 1999. This was \$63 less than the value reported in June 1998, a 2.9 percent decrease. This decline ends 11 consecutive years of increasing values. Cash rents declined from 1998 to 1999 on average land by a little less than two percent to \$110 per acre. This is the first decline in cash rental rates for average land since the decline reported in 1993.

Statewide Land Values

For the *six months* ending in June 1999, the value of bare tillable land was reported to have decreased 2.1 percent on top land, 2.4 percent on average land, and 2.5 percent on poor land (Table 1). This is the first time in 11 years that the average value for all three land types declined.

* In 1998, 52 percent of the respondents reported that some or all classes of land increased in value from December 1997 to June 1998.

** In 1998, 13 percent of the respondents reported that some or all classes of land declined in value from December 1997 to June 1998.

*** Transitional land is land that is moving out of agriculture.

While statewide land values moved lower for this six-month period, local conditions always exert important influences. Twenty-four percent of the survey respondents indicated that all classes of land were the same or higher during the December 1998 to June 1999 period. While respondents indicated that the land market still has strength in some areas, the percentage of respondents indicating that some or all classes of land increased in value was less than half the number that made a similar report in 1998.* Thirty-seven percent of the respondents indicated that some or all classes of land fell in value during the same six-month period.** Thirty-one percent indicated that land values remained unchanged during the six-month period.

The statewide *12-month* decrease in average value from June 1998 to June 1999 was 2.9 percent (Table 1). Top-quality land (155 bushel corn yield rating) was estimated to have declined by \$72 per acre to \$2,643 (Table 1). Average land (126 bushel corn yield rating) was valued at \$2,092, a decline of \$63, while poor land (97 bushel corn yield rating) was estimated to be worth \$1,546 per acre, a decline of \$86.

The land value per bushel of corn yield rating also declined this year. For top-quality land, the value per bushel of yield was \$17.08, down by

5.2 percent. Average quality land value was \$16.57 per bushel, while the poor quality value was \$15.92 per bushel (Table 1). The percentage decreases were 5.8 percent on average land and 7.0 percent on poor land. These per-bushel figures are \$0.94 lower than last year on top land, \$1.02 lower on average land, and \$1.20 lower on poor land.

The value of transition land moving into non-farm uses also exhibited some decline. The average value of transitional land in June 1999 was \$6,109.*** For the six-month period from December 1998 to June 1999, transitional land increased by \$245 per acre, 4.2 percent. Even with this increase, the June 1999 reported value was 2.1 percent less than the average of \$6,149 reported in June 1998 (Table 1). However, due to the wide variation in estimates (from \$1,400 to \$25,000 in June, 1999), the median value may give a more meaningful picture than the



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Table 1. Average estimated Indiana land value per acre (tillable, bare land) and per bushel of corn yield, percentage change by geographic area and land class, selected time periods, Purdue Land Values Survey, June 1999

Area	Land Class	Corn bu/A	Land Value					Land Value/Bu			Projected Land Value	
			Dollars Per Acre			% Change		\$ Amount		% Change	Dec. 1999	% Change
			June 1998	Dec 1998	June 1999	6/98-6/99	12/98-6/99	1998	1999	6/98-6/99		
\$/A	\$/A	\$/A	%	%	\$	\$	%	\$	%			
North	Top	156	2,533	2,618	2,588	2.2%	-1.1%	16.47	16.59	0.7%	2,536	-2.0%
	Average	123	1,893	1,965	1,925	1.7%	-2.0%	15.71	15.68	-0.2%	1,880	-2.3%
	Poor	90	1,375	1,358	1,344	-2.3%	-1.0%	15.32	14.89	-2.8%	1,312	-2.4%
Northeast	Top	149	2,602	2,574	2,492	-4.2%	-3.2%	18.08	16.78	-7.2%	2,437	-2.2%
	Average	123	1,996	2,058	1,997	0.1%	-3.0%	16.67	16.29	-2.3%	1,940	-2.9%
	Poor	97	1,522	1,596	1,531	0.6%	-4.1%	16.26	15.82	-2.7%	1,493	-2.5%
W. Central	Top	156	2,939	2,858	2,780	-5.4%	-2.7%	19.00	17.77	-6.5%	2,713	-2.4%
	Average	131	2,432	2,342	2,267	-6.8%	-3.2%	19.20	17.35	-9.6%	2,216	-2.3%
	Poor	101	1,824	1,711	1,663	-8.8%	-2.8%	18.27	16.43	-10.1%	1,619	-2.6%
Central	Top	160	3,026	2,966	2,867	-5.3%	-3.3%	19.44	17.91	-7.9%	2,772	-3.3%
	Average	133	2,529	2,459	2,372	-6.2%	-3.5%	19.65	17.88	-9.0%	2,292	-3.4%
	Poor	104	1,963	1,923	1,863	-5.1%	-3.1%	18.91	17.98	-4.9%	1,800	-3.4%
Southwest	Top	158	2,646	2,644	2,611	-1.3%	-1.2%	17.01	16.50	-3.0%	2,576	-1.3%
	Average	126	1,935	1,964	1,929	-0.3%	-1.8%	15.79	15.27	-3.3%	1,897	-1.7%
	Poor	95	1,332	1,313	1,269	-4.7%	-3.4%	14.62	13.35	-8.7%	1,234	-2.8%
Southeast	Top	145	2,183	2,182	2,246	2.9%	2.9%	16.06	15.46	-3.7%	2,291	2.0%
	Average	117	1,781	1,718	1,783	0.1%	3.8%	16.05	15.22	-5.2%	1,833	2.8%
	Poor	91	1,461	1,330	1,338	-8.4%	0.6%	16.85	14.68	-12.9%	1,402	4.8%
Indiana	Top	155	2,715	2,699	2,643	-2.7%	-2.1%	18.02	17.08	-5.2%	2,588	-2.1%
	Average	126	2,155	2,143	2,092	-2.9%	-2.4%	17.59	16.57	-5.8%	2,046	-2.2%
	Poor	97	1,632	1,586	1,546	-5.3%	-2.5%	17.12	15.92	-7.0%	1,512	-2.2%
	Trans. ¹		6,149	5,774	6,019	-2.1%	4.2%				6,212	3.2%

¹ Land moving out of agriculture

arithmetic average. The median value of transitional land in June, 1999 was \$5,000 per acre, the same

value reported in June, 1998. The median value of individual home sites up to five acres and sites of 10

acres or more suitable for residential sub-divisions was also \$5,000 per acre. The median value in 1998 for 5-acre sites was \$5,000 per acre. The median value in 1998 for 10-acre sites was \$4,500.

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Statewide Rents

Cash rents decreased statewide from 1998 to 1999 by \$2 per acre on all classes of land (Table 2). The estimated cash rent on top land was \$138 per acre, \$110 per acre on average land, and \$84 per acre on poor land. Rent per bushel of estimated corn yield was \$0.89 on top land and \$0.87 on average and poor land, down four cents from last year.

Last year's reported cash rent values set new highs. The previous high was achieved in 1981. Cash rent on top land in 1999 still exceeded by \$1 the 1981 level of \$137 per acre. Average land exceeded the 1981 value of \$106 per acre by \$4, while rents on

poor land exceeded by \$6 the 1981 level of \$78 per acre.

Statewide, cash rent as a percentage of estimated land value remained the same or increased, ending seven years of consecutive declines. For 1999, cash rent as a percentage of value remained at 5.2 percent on top land. The value for average land increased to 5.3 percent, and the value for poor land increased to 5.4 percent (Table 2).

Area Land Values

Changes in the value of farmland in the six different geographic areas of Indiana (Figure 1) for December 1998 to June 1999, ranged from a 3.8 percent increase for average land in the Southeast to a decrease of 4.1 percent for poor land in the Northeast (Table 1). For the December 1998 to June 1999 period, the Southeast region reported increases for all land types. All other regions reported declines in value for all land types. In the North, West Central, and Central regions, average land experienced the largest declines. Poor land experienced the largest decline in the Southwest.

For the year ending in June 1999, the change in land values ranged from a 2.9 percent increase in top farmland in the Southeast to a 8.8 percent decline for poor land in the West Central region. In addition to the Southeast, other increases in land values for the year ending in June 1999, were for top land (2.2 percent) and average land (1.7 percent) in the North region. The changes in land values for all other regions were declines. The largest decline in land value was for poor land in the West Central region, declining nearly nine percent. The next largest decline was average land in the West Central region.

The highest valued top-quality land was in the Central area, \$2,867 per acre. The next highest values were in the West Central (\$2,780), Southwest (\$2,611), North (\$2,588), and Northeast (\$2,492) regions. Reported values for average quality land were \$2,372 in the Central and \$2,267 in the West Central areas but only around \$1,800 to \$1,900 in the

Table 2. Average estimated Indiana cash rent per acre, (tillable, bare land) 1998 and 1999, Purdue Land Value Survey, June 1999

Area	Land Class	Corn bu/A	Rent/Acre		Change '98-'99 %	Rent/bu. of Corn		Rent as % of June Land Value	
			1998 \$/A	1999 \$/A		1998 \$/bu.	1999 \$/bu.	1998 %	1999 %
North	Top	156	138	139	0.7%	0.90	0.89	5.4	5.4
	Average	123	107	108	0.9%	0.89	0.88	5.7	5.6
	Poor	90	79	78	-1.3%	0.88	0.87	5.7	5.8
Northeast	Top	149	132	127	-3.8%	0.92	0.86	5.1	5.1
	Average	123	102	101	-1.0%	0.85	0.82	5.1	5.1
	Poor	97	80	80	0.0%	0.85	0.83	5.3	5.2
W. Central	Top	156	154	153	-0.6%	0.99	0.98	5.2	5.5
	Average	131	126	125	-0.8%	0.99	0.96	5.2	5.5
	Poor	101	101	97	-4.0%	1.01	0.96	5.5	5.8
Central	Top	160	151	148	-2.0%	0.97	0.92	5.0	5.2
	Average	133	125	122	-2.4%	0.97	0.92	4.9	5.1
	Poor	104	98	96	-2.0%	0.94	0.93	5.0	5.2
Southwest	Top	158	138	132	-4.3%	0.88	0.83	5.2	5.1
	Average	126	107	102	-4.7%	0.88	0.81	5.5	5.3
	Poor	95	75	74	-1.3%	0.82	0.78	5.6	5.8
Southeast	Top	145	109	108	-0.9%	0.80	0.74	5.0	4.9
	Average	117	89	83	-6.7%	0.80	0.71	5.0	4.8
	Poor	91	70	64	-8.6%	0.80	0.70	4.8	4.7
Indiana	Top	155	140	138	-1.4%	0.93	0.89	5.2	5.2
	Average	126	112	110	-1.8%	0.91	0.87	5.2	5.3
	Poor	97	86	84	-2.3%	0.91	0.87	5.3	5.4

other areas. Some of the area differences in value reflect the difference associated with the respondents' estimates of corn yield. For example, average land in the Southeast had a corn yield rating of 117 bushels per acre, in the Southwest 126 bushels per acre, and in the North, 123 bushels; however, the land values per bushel of corn yield estimates were about the same.

Land values per bushel of estimated average corn yield (land value divided by bushels) on top land were in a range between \$17.77 to \$17.91 for the Central and West Central regions (Table 1) and between \$16.50 to \$16.78 for the Southwest, North, and Northeast. Land values per bushel declined as land quality (corn yield estimates) declined in all areas except the Central region.

Table 3. Median value of five-acre home sites and home sites of 10 acres or more

Area	Median Value, \$ per acre					
	Under 5 Acres			10 Acres & Over		
	1997 \$/A	1998 \$/A	1999 \$/A	1997 \$/A	1998 \$/A	1999 \$/A
North	5,000	5,000	5,000	4,250	4,000	5,000
Northeast	4,250	5,000	5,000	4,000	4,000	4,000
West Central	5,000	5,000	5,000	5,000	4,700	4,000
Central	5,000	5,000	5,000	4,500	5,000	5,000
Southwest	4,250	5,000	5,000	5,000	4,500	5,000
Southeast	4,000	5,000	5,000	3,500	3,000	3,750

Respondents were asked to estimate rural home sites with no accessible gas line or city utilities and located on a black top or well maintained gravel road. The median value for five-acre home sites was \$5,000 in all areas (Table 3). These values are the same as those reported in 1998. Estimated per acre median values of the larger tracts (10 acres) ranged from \$4,000 to \$5,000 except for the \$3,750 estimate in the Southeast.

Area Cash Rents

The only region to report increases in cash rents was the North region (Table 2). Top and average land in this region each increased by only \$1 per acre. Poor land in the North region declined by \$1 per acre. Declines in cash rents were reported

for all other regions and land qualities except for poor land in the Northeast, which remained the same. Last year, declines in four area cash rent values were reported.

The largest declines in cash rent occurred for average and poor land in the Southeast region, declining 6.7 and 8.6 percent, respectively. This was followed by declines of 4.3 and 4.7 percent for top and average land respectively in the Southwest region. Declines in the Central region were in the range of 2.0 - 2.5 percent. Poor land had the largest declines in the North, West Central, and Southeast regions. Top land had the largest decline in the Northeast region and average land had the largest decline in the Central and Southwest region.

Cash rents were again highest in the West Central and Central areas

at \$153 and \$148 per acre, respectively for top land, and \$125 and \$122 per acre, respectively, for average land. Cash rents of between \$0.92 and \$0.98 per bushel were also highest in these areas. The per-bushel rent for top land was 89¢ in the North, 86¢ in the Northeast, 83¢ in the Southwest, and 74¢ in the Southeast. In all areas, rates per bushel within areas varied by 5¢ or less by land quality.

Except for the Southeast, cash rent as a percentage of land value increased or remained the same for all land classes. In the Southeast, rent as a percentage of land value continued to decline.

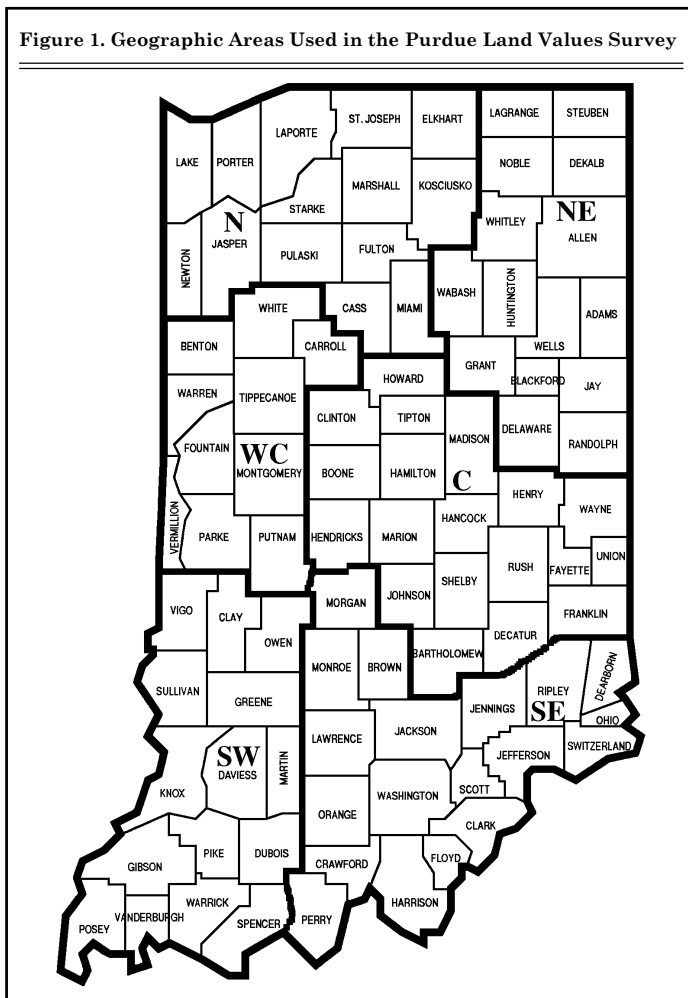
Land Market Activity

A reduced number of farmland transfers is often the land market's response to a decline in expected returns. While the survey does not provide strong evidence that transfer numbers are declining, survey respondents indicated that some reduction in the number of transfers may be occurring. The number of farmland transfers in the six months ending in June compared to a year earlier was estimated to be up by 22 percent of the respondents versus 34 percent last year. No change in the number of transfers was reported by 48 percent of the respondents, while 30 percent (compared to 20 percent in 1998) indicated a reduction in the number of transfers.

More land was thought to be on the market now by 15 percent of the respondents. Last year, 19 percent of the respondents indicated more land was thought to be on the market, and in 1997, 12 percent of the respondents indicated more land was thought to be on the market.

Respondents were asked their perception of items that might be influencing the supply of land on the market compared to a year earlier. The number of retiring or retired farmers selling land was identified by 33 percent of the respondents as a reason for an increased supply. The expectation that land values have peaked was identified by 38 percent of the respondents as a reason for the increased supply of farmland for

Figure 1. Geographic Areas Used in the Purdue Land Values Survey



sale, and 39 percent of the respondents indicated that reduced profit expectations were a reason for an increasing supply of farmland.

Respondents were also asked to provide their perceptions of how the purchasers of farmland had changed from a year earlier. Demand from farmers was said to have increased by 15 percent of the respondents, while 39 percent of the respondents indicated that farmer demand had declined. In 1998, 39 percent of the respondents indicated an increase in farmer demand, while 16 percent indicated a decline.

Nearly everyone (87 percent) indicated an increase in demand for rural residences. Less than one percent of the respondents indicated a decrease in demand for rural residences, while 12 percent indicated no change. Twenty-five percent of the respondents indicated that individual nonfarm investors in farmland had increased, while 20 percent indicated that this source of demand had decreased. In 1998, 32 percent of the respondents indicated an increase from individual nonfarm investors, while 13 percent indicated a decrease in demand from individual nonfarm investors.

The purchase of farmland by pension funds and other large investors is always a topic of discussion. Six percent of the respondents indicated that, compared to a year ago, demand from this source had increased, 35 percent indicated a decrease, and 59 percent indicated no change. In 1998, the number indicating an increase was about the same, at five percent, but the number indicating a decrease was only six percent, compared to the 35 percent this year.

Land Value/Cash Rent Multiples

While the recent change in land value has a strong influence on land value's future direction, the returns to a land investment must also be considered. One way to assess the relationship between the return to land and land values is to observe the land value/cash rent multiple. This is similar to the "price/earnings ratio" often referred to by stock

market analysts. For example, data from the 1999 Purdue survey indicates a value/rent multiple of 19.0 ($\$2,092/\$110 = 19.0$). Is this figure abnormally high, thus suggesting that land values are too high? To answer this question we need to have an estimate of what is "normal."

For the period 1975 to 1999, the value to rent multiple has ranged from a low of 12.4 in 1986 to a high of 20.6 in 1979 (Figure 2). Over the 1975 to 1999 period, the value to rent multiple averaged 16.0 with a standard deviation of 2.5. At a multiple of 19.0, the value to rent multiple is in a range similar to the 1978 to 1981 period. If one assumes that the value to rent multiple is normally distributed, this means there is only a 13-percent chance that a higher value will be achieved. Or looking at it from the other side, there is an 87-percent chance of a lower value to rent multiple. Since 1975, the land value to rent multiple has exceeded 19.0 in only five years (1978-1981 and 1998), indicating that the value to rent multiple is more likely to decline than increase.

There are three ways the value to rent multiple could decline. One is for rent to remain fairly constant and land value to decline. An alternative would be a fairly constant land value and increasing rent. The third alternative would be a combination of both land value and rent changes. Which scenario unfolds will

depend on several factors explored in the following section.

Farmland Value Outlook

The fact that average Indiana farmland values declined for the year ending in June 1999, bringing to a close an 11-year period of increases, raises the question, "Will land values continue to decline?" Certainly, low crop prices will place downward pressure on farmland values. But at the same time, low interest rates and prospects of increased government income support provide positive influences.

The respondents' optimism regarding the general trend in land during the June to December period continues to decline. In 1997, 54 percent of the survey respondents expected some or all classes of land to increase. In 1998, this percentage dropped to 28 percent and stands at 19 percent this year. In 1997, only six percent of the respondents expected a decline in values. In 1998, 26 percent of the respondents expected some or all types of land values to decline. This year, 38 percent of the respondents expect a decline. Thirty-five percent of the respondents expect land values to remain the same, a percentage similar to the 38 percent in 1997 and the 39 percent in 1998.

When asked to project land values for December 1999, respondents reported declines in value for all land types and all areas of the state

Figure 2. Indiana Average Cropland Value to Rent Multiple, 1975-1999, Purdue Land Values Survey

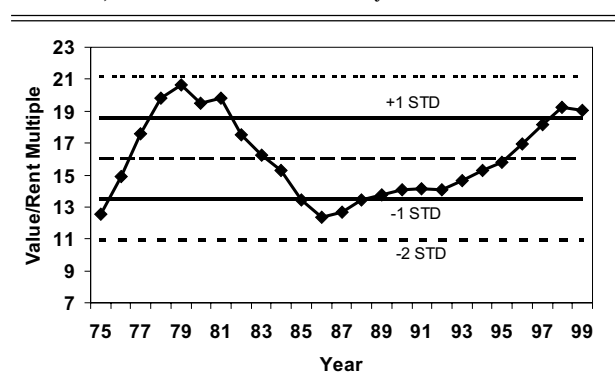


Table 4. Projected five-year average corn and soybean prices, mortgage interest and inflation

Year	Prices, \$ per bu.		Rate, % per year	
	Corn	Beans	Interest	Inflation
1984	\$3.13	\$7.35	13.3%	6.5%
1985	2.70	6.13	12.3%	5.1%
1986	2.32	5.43	11.0%	4.2%
1987	2.16	5.62	10.7%	4.5%
1988	2.50	6.82	10.9%	4.6%
1989	2.48	6.55	11.0%	4.7%
1990	2.61	6.22	11.0%	4.6%
1991	2.47	6.07	10.4%	4.2%
1992	2.52	6.04	9.5%	3.8%
1993	2.35	5.96	8.7%	3.8%
1994	2.48	6.18	8.9%	3.8%
1995	2.50	6.02	9.2%	3.9%
1996	3.01	6.63	9.1%	3.7%
1997	2.72	6.81	9.0%	3.4%
1998	2.54	6.34	8.6%	3.1%
1999	2.31	5.57	8.4%	2.9%
Average	\$2.55	\$6.23	10.1%	4.2%

except the Southeast region. For the southeast, top land was expected to increase 2.0 percent, average land 2.8 percent, and poor land 4.8 percent. The largest declines were expected in the central region (Table 1). Compared to last year, when there was no strong consensus regarding the future direction of land values, this year points towards

continued short-term declines, except in the Southeast. These projections in the past have accurately predicted direction, but have not been a good indicator of the actual magnitude of change.

When asked about their longer run expectations over the next five years, about 51 percent of the respondents predicted that land

values would increase. The remaining 49 percent were divided between expecting a decline (25 percent) or no change (24 percent). In last year's survey, the number of respondents expecting an increase was 65 percent, and the number expecting a decline or no change was only 35 percent. On average, respondents expected a small increase of two percent for the five years. In 1998, respondents expected land values for the five-year period to increase 4.4 percent, and in 1997 they were expecting a 10-percent increase.

Expectations regarding intermediate crop prices have a strong influence on farmland values because of their impact on the return to the land investment and their impact on the cash flows associated with the investment purchase. In order to gain some insight into the income level expected from a land purchase, respondents were asked to estimate annual average prices over the next five years for corn and soybeans. Respondents have made projections since 1984 (Table 4).

A 23¢-decrease occurred in the expected five-year average price of corn. This year the expected five-year average price of soybeans declined 77¢. Gross revenue expectations for 126 bushel corn yields and 45 bushel beans in a 50-50 rotation

Table 5. Average values for factors influencing farmland values and percentage of respondents selecting individual values

Influence	Average Value	Percentage of respondents selecting value									
		-5	-4	-3	-2	-1	1	2	3	4	5
Current net farm income	-2.9	18.1	17.5	31.6	18.1	10.2	1.5	1.2	0.6	0.3	0.6
Expected growth in returns to land	-1.2	5.7	6.6	19.0	18.1	23.2	12.4	11.1	1.8	1.5	0.3
Crop price level & outlook	-3.1	25.2	17.9	23.8	20.8	8.5	2.1	0.3	0.0	0.3	1.2
Livestock price level & outlook	-2.8	20.8	14.6	22.9	20.5	16.1	3.3	0.9	0.0	0.3	0.6
Current & expected interest rates	1.4	0.3	0.6	2.7	1.8	15.4	28.2	30.6	15.7	4.2	0.3
Returns on competing investments	-1.2	8.3	7.4	14.3	19.0	24.1	11.0	8.6	4.5	2.4	0.3
U.S. economic outlook	0.7	1.2	1.8	4.0	7.7	14.8	32.5	25.4	8.6	3.6	0.0
Overseas economic outlook	-1.3	5.8	5.2	14.3	20.4	29.5	16.1	7.0	1.5	0.3	0.0
Outlook for local economy	0.7	1.2	1.5	5.1	3.9	20.8	31.9	17.5	12.3	4.5	0.9
U.S. inflation/deflation rate	1.1	0.3	0.0	0.9	5.0	11.5	42.5	24.8	12.7	2.5	0.0
U.S. agricultural export sales	-1.6	5.7	9.0	16.9	21.7	28.0	11.1	4.5	1.5	0.6	0.6
Increase/decrease in cash rents	-0.3	0.9	1.5	8.3	12.6	31.6	32.5	6.4	3.1	2.1	0.3
Income enhancing technologies	1.0	0.3	0.0	1.9	1.9	13.9	52.8	19.6	7.6	1.3	0.3
Current inventory of land for sale	0.9	0.6	0.0	1.8	6.4	17.7	41.2	18.6	7.9	4.6	1.2
Current cash liquidity of buyers	0.7	2.7	3.0	4.5	9.1	14.2	25.4	19.6	15.4	4.5	1.5
Current U.S. agricultural policy	-1.2	9.8	4.6	12.3	16.3	28.9	20.0	5.2	1.8	0.9	0.0

declined \$32 per acre from last year. To the extent that land market participants have similar reduced expectations, this reduction in revenue expectations will exert downward pressure on land values.

Other important factors associated with a land purchase include the expected farm mortgage interest rate and the rate of inflation. As mortgage rates decline, the cash flow subsidy that is often required by a land purchase is less. This is the eighth consecutive year that expected farm mortgage interest rates have remained under 10 percent and inflation under four percent.

In an effort to gain additional insight into how various factors influence land values, survey respondents were asked to score 16 different influences of farmland value (Table 5). The value given to each influence could range from a -5 to a +5. The -5 indicates a strong negative influence on farmland values, and a +5 indicates a strong positive influence. The average value for each influence and the percentage of respondents selecting each value is presented in Table 5.

Positive influences included current and expected interest rates, the outlook for the U.S. and local economies, income-enhancing technologies, current land inventories, and the cash liquidity of buyers. While there were several positive influences, none of these factors received a high average rating. With the exception of current and expected interest rates and U.S.

**** For the period of 1975 to 1999, the value to rent multiple declined eight times. The 6.5 percent value is the average of these declines.

inflation/deflation, the positive influences received an average score of 1 or less.

It was not surprising to find crop and livestock price levels, current farm income, exports, and the outlook for overseas economies as major negative influences. Current net farm income and the crop and livestock price levels and outlook received average scores between -3.1 and -2.8. Only one of the negative influences, the increase/decrease in cash rents, received an average score between 0 and -1.

While the average value provides some indication of the importance of the influence, the distribution of the agreement among respondents regarding the weight of the influence. For example, the U.S. inflation/deflation rate received an average weight of 1.1, and 67 percent of the respondents gave it a weight of 1 or 2. The expected growth in returns to land received a -1.2 average weight, but the values selected were not as concentrated as for the U.S. inflation/deflation rate.

If the opinions of the respondents are representative of other farmland market participants, this would indicate that further reductions in land values are likely. To assess the potential decline in farmland values, let's consider a possible scenario. Assume that over the next several years cash rent for average land is expected to average \$104 per acre, about five percent less than the current estimated cash rent and about \$3 less than the average cash rent for the last five years. Let's also assume that the value to rent multiple moves closer to its mean by declining by 6.5 percent.**** This would make the value to rent multiple 17.8. Using the estimated cash

rent of \$104 per acre and the estimated value to rent multiple of 17.8, gives a farmland value of \$1,851. This value is 12-percent less than the 1999 value reported for average Indiana farmland.

This is one possible scenario. There are many uncertainties, and thus many other possible future scenarios that could unfold. At this time, the negative influences appear to outweigh the positive influences, and in the short term land values can be expected to decline. It appears likely that this year will result in an abundant U.S. crop of corn and soybeans. However a crop shortage in other parts of the world can cause the commodity price picture to change quickly. While difficult times often present opportunities, this is a time to be cautious when bidding on farmland to purchase or cash rent. This is a time when developing a plan can have big rewards. It is also a time to develop contingency plans just in case the future we see does not materialize.

The land values survey was made possible by the cooperation of professional farm managers, appraisers, brokers, bankers, county extension educators, and persons representing the Farm Credit System, the Farm Service Agency (FSA) county offices, and insurance companies. Their daily work requires that they stay well-informed about land values and cash rents in Indiana. The authors express sincere thanks to these friends of Purdue and Indiana agriculture. They provided 374 responses representing all Indiana counties. We also express appreciation to Carolyn Hunst of the Department of Agricultural Economics for her help in conducting the survey.

Other Upcoming Events

10th Farm Management Day, December 11, 1999. For high-school kids who might go to college, and their parents who farm.

20th Farming Together Workshop, February 4-5, 2000. For families now farming together or considering doing so.

68th State Farm Management Tour, July 5-6, 2000, in northwest Indiana this year.

Large-Scale Farmers' Views of Sources and Responses to Risk

George F. Patrick, Professor and Wesley N. Musser,
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visiting professor at Purdue University)

Farming is a dynamic industry. The sources of risk which producers face and responses which they make to manage risk in their farming operations change. For example, the "Freedom to Farm Act" in 1996 eliminated the deficiency payment program and replaced it with declining and non-price-responsive production flexibility payments. The standing crop disaster assistance program was also eliminated, and major changes were introduced in crop insurance. New marketing tools, often involving multiple positions in the market, have been developed for farmers' use. Participants in the Top Farmer Crop Workshop (TFCW) held at Purdue University have been surveyed about their perceptions of the sources of and responses to risk. This article compares the views and

responses of the 1991, 1993, and 1997 TFCW participants. Although producers' views of sources of and responses to risk have changed some, additional changes will be necessary to respond to evolving economic conditions, such as the current extended period of low prices.

The Sample

Participants in the TFCWs are not a representative sample of all farmers, but their views and opinions are considered typical of large-scale commercial farmers. There were no significant differences in the number of acres operated, age of respondents, or their educational level among the three survey years. The farms averaged about 1,900 acres of crops (primarily corn and soybeans), and all had gross farm receipts of over \$100,000. The producers responding

were about 40 years of age and had completed more than three years of education beyond high school. Typically, less than 20 percent of the respondents received more than 25 percent of their gross income from livestock. Participants were asked to rate, on a scale of one (low) to five (high), the importance of a number of sources of risk in their decision making. Participants were asked to use a similar scale to rate the importance of a number of responses to risk and also to indicate whether they used the response in their farm operation.

Sources of Risk

Table 1 summarizes the averages and standard deviations of eight of the most highly rated sources of risk from the 1991, 1993, and 1997 surveys. Not surprisingly for TFCW producers, crop price and crop yield variability were the most highly rated sources of risk in two of the three years studied. Injury, illness, or death of the operator was the top-rated source of risk in the 1993 survey and was third in the other two years. Because of changes in the government program as a result of the "Freedom to Farm Act," it is commonly believed that crop prices may be more variable in the future. This view is consistent with producers' ratings in Table 1. The 4.61 rating on the 5-point scale of importance for crop price variability in 1997 is significantly higher than the 4.30 for 1991 and 4.17 for 1993. At the same time, the 3.20 rating of importance given to the government commodity program in 1997 was significantly lower than the 3.83 in 1991 and 3.63 in 1993.

The importance rating associated with injury, illness, or death of the operator increased from 1991 to 1993 and then declined in 1997. However, because of the relatively large standard deviations (reflecting a wider

Table 1. Averages and Standard Deviations of Ratings of Importance¹ of Highly Rated Sources of Risk for Top Farmer Crop Workshop Participants.²

Source of Risk	1991 N=77	1993 N=60	1997 N=41
Crop price variability	4.30 ^a (0.87)	4.17 ^a (0.85)	4.61 ^b (0.63)
Crop yield variability	4.22 ^{a,b} (0.91)	4.12 ^a (0.78)	4.49 ^b (0.68)
Injury, illness, or death of operator	3.86 ^a (1.29)	4.37 ^a (0.97)	4.10 ^a (1.16)
Government commodity program	3.83 ^a (1.09)	3.63 ^a (1.02)	3.20 ^b (0.80)
Environmental regulations	3.78 ^a (1.03)	4.15 ^b (0.78)	3.73 ^a (0.78)
Input costs	3.69 ^a (0.89)	3.87 ^a (0.83)	3.90 ^a (0.80)
Costs of capital items	3.64 ^a (0.93)	3.73 ^a (0.82)	3.95 ^a (0.89)
Average of 15 sources	3.47 ^a (0.61)	3.61 ^a (1.02)	3.56 ^a (0.51)

¹ Importance was evaluated on a Likert-type scale of 1(not very important) to 5 (very important).

² Average values for the importance of a source of risk in different years with the same superscript are not statistically different.

range of responses of producers) these differences were not statistically significant. The importance of environmental regulations as a source of risk was significantly higher in 1993 than in other years. This probably reflects the concern about the need for conservation tillage and crop producers' adjustments. If livestock had been of greater importance to these producers, the decline in the importance of environmental regulation between 1993 and 1997 might not have occurred.

In 1997, for the first time, the survey questionnaire included changes in business arrangements with output purchasers and with input suppliers as sources of risk. Changes with respect to output purchasers rated 4.12 on the 5-point scale of importance. The 4.12 rating was third among the sources of risk in 1997 and rated above injury, illness, or death of the operator in importance. In contrast, changes in business arrangements with input suppliers rated 3.15, which was well below the average of 3.56 for all sources in 1997.

Input costs and the costs of capital items were among the highly

rated sources of risk in all three years. The importance rating of both increased over the period, but the increases were not statistically significant. Overall, the average importance rating of the 15 sources of risk considered in all three surveys did not differ significantly.

Table 2 summarizes some of the lower rated sources of risk. Livestock price and yield variability received low ratings, 2.39 and 2.15, respectively, in 1997, reflecting the limited importance of livestock to TFCW participants, and they are excluded from the table. For 1997, land rents were the lowest rated source of risk, and the rating was significantly lower than in previous surveys. Although differences were not statistically significant, credit availability and interest rates increased steadily in importance as sources of risk from 1991 to 1997. With the exception of changes in technology, the standard deviations of the lowly rated sources of risk were larger than for the highly rated sources of risk. This indicates a greater range of producer responses with respect to the lowly rated sources of risk. Although some producers considered these sources

of risk as very important in their farm operations, most producers rated them as relatively unimportant.

Responses to Risk

Producers may make a variety of responses to manage risk. The 1991 survey considered 16 responses, while the 1997 survey considered 25. Table 3 summarizes the averages and standard deviations for all three surveys of the responses to risk rated at 4.0 or above in 1997. Liability insurance was the top-rated risk response in all three surveys. Forward contracting of some commodities was the second-rated response in 1997, and there was a statistically significant increase in its rating between 1991 and the later surveys. Health insurance was the third-rated response in 1997, and its 1997 rating was significantly higher than in 1993. Although liability insurance and forward contracting were the most highly rated responses to risk, only 78 percent of respondents indicated that they had liability insurance or used forward contracting, and 71 percent had health insurance. Levels of use by

Table 2. Averages and Standard Deviation of Ratings of Importance³ of Lowly Rated Sources of Risk For Top Farmer Crop Workshop Participants.⁴

Source of Risk	1991 N=77	1993 N=60	1997 N=41
Land rents	3.16 ^a (1.16)	3.52 ^a (0.95)	2.50 ^b (1.52)
Family labor force	2.93 ^a (1.24)	3.08 ^a (1.27)	3.41 ^a (1.14)
Credit availability	3.03 ^a (1.25)	3.18 ^a (1.14)	3.44 ^a (1.18)
Interest rates	3.45 ^a (1.09)	3.48 ^a (1.14)	3.63 ^a (1.03)
Family relationships	3.35 ^a (1.39)	3.71 ^a (1.29)	3.68 ^a (1.33)
Technology	3.51 ^a (1.02)	3.82 ^a (0.97)	3.80 ^a (0.81)
Average of 15 sources	3.47 ^a (0.61)	3.61 ^a (0.53)	3.56 ^a (0.51)

³ Importance was evaluated on a Likert-type scale of 1 (not very important) to 5 (very important).

⁴ Average values for the importance of a source of risk in different years with the same superscript are not statistically different.

Table 3. Averages and Standard Deviations of Ratings of Importance⁵ of Highly Rated Responses to Risk by Top Farmer Crop Workshop Participants.⁶

Risk Response	1991 N=77	1993 N=60	1997 N=41
Liability insurance	4.42 ^a (0.94)	4.43 ^a (0.57)	4.54 ^a (0.87)
Forward contracting	3.86 ^a (0.98)	4.24 ^b (0.66)	4.32 ^b (0.72)
Health insurance	—	3.91 ^a (0.94)	4.27 ^b (0.89)
Being a low-cost producer	4.27 ^a (0.88)	4.43 ^a (0.68)	4.15 ^a (0.96)
Using production practices which work under a variety of circumstances	—	4.37 ^a (0.64)	4.10 ^a (0.74)
Maintaining financial/credit reserve	3.88 ^a (0.93)	4.10 ^a (0.74)	4.05 ^a (0.77)
Average of 16 responses	3.27 ^a (0.50)	3.48 ^a (0.52)	3.46 ^a (0.47)

⁵ Importance was evaluated on a Likert-type scale of 1 (not very important) to 5 (very important).

⁶ Average values for the importance of a response to risk in different years with the same superscript are not statistically different.

producers was consistently slightly lower in 1993, but the differences were not significant.

Being a low-cost producer, using production practices which work under a variety of conditions, and maintaining a financial/credit reserve were the next three highly

ranked responses to risk. There were no statistically significant differences among years. In 1997, 68 percent of the TFCW participants indicated they used production practices which worked under a variety of conditions, 58 percent maintained financial/credit reserves, and 56

percent felt they were low-cost producers.

Table 4 provides the averages and standard deviations of the lowly rated responses to risk. The lowest rating of importance that off-farm employment received is not surprising given the large scale of the farm operations involved in the TFCW. Although multiple peril crop insurance increased steadily in its importance rating, the differences among years were not statistically significant. Hail/fire insurance for crops rated slightly higher in importance as a response to risk than multiple peril crop insurance all three years. In spite of the low ratings of importance as responses to risk, 44 and 46 percent of producers in 1997 indicated they used hail/fire and multiple peril crop insurance, respectively.

Two of the marketing responses to risk in Table 4, minimum prices contracts and use of commodity options, had significant increases in their ratings of importance. Given the expected greater importance of variability in prices after "Freedom to Farm Act," the increase in importance of these responses is not unexpected. However, the increases in importance ratings occurred between 1991 and 1993, not after the 1996 Farm Bill. Levels of use by producers were not statistically different between 1993 and 1997. Almost 22 percent of producers in 1997 used minimum price contracts, as compared with 20 percent in 1991. The percent using options went from 35 percent in 1993 to over 41 percent in 1997.

There were a number of commonly suggested responses to risk which fell into a middle group in terms of importance to the TFCW participants. Some of those included in this category were diversification of enterprises, having back-up labor/management, off-farm investments, and debt-leverage management. Although the ratings of importance were not high, almost 50 percent of producers in 1997 used diversification, 38 percent had back-up labor/management, 42 percent had off-farm investments, and 53 percent used debt-leverage management.

Table 4. Averages and Standard Deviations of Ratings of Importance⁷ of Lowly Rated Responses to Risk for Top Farmer Crop Workshop Participants.⁸

Risk Response	1991 N=77	1993 N=60	1997 N=41
Off-farm employment	2.06 ^a (1.22)	2.12 ^a (1.20)	2.20 ^a (1.30)
Multiple peril crop insurance	2.19 ^a (1.33)	2.67 ^a (1.43)	2.78 ^a (1.26)
Hail/fire insurance for crops	2.84 ^a (1.50)	3.09 ^a (1.20)	2.90 ^a (1.19)
Off-farm investments	2.55 ^a (1.08)	3.05 ^b (1.18)	2.98 ^b (1.07)
Geographic dispersion of production	3.12 ^a (1.05)	3.05 ^a (1.16)	3.15 ^a (0.99)
Minimum price contracts	2.51 ^a (1.18)	3.00 ^b (1.07)	3.15 ^b (0.99)
Commodity options to place a floor under the selling price	2.70 ^a (1.29)	3.14 ^{ab} (1.12)	3.24 ^b (1.14)

⁷ Importance was evaluated on a Likert-type scale of 1(not very important) to 5 (very important).

⁸ Average values for the importance of a response to risk in different years with the same superscript are not statistically different.

Table 5. Average and Standard Deviation of Risk Responses with Significant Changes in Ratings of Importance⁹ by Top Farmer Crop Workbook Participants.¹⁰

Risk Response	1991 N=77	1993 N=60	1997 N=41
Forward contracting	3.86 ^a (0.98)	4.24 ^b (0.66)	4.34 ^b (0.72)
Health insurance	—	3.91 ^a (0.94)	4.27 ^b (0.89)
Hedging the selling price of crops	3.21 ^a (0.98)	3.74 ^b (1.14)	3.78 ^b (0.94)
Government program participation	3.82 ^a (1.07)	3.90 ^a (1.00)	3.49 ^b (1.12)
Commodity options to place a floor under the selling price	2.70 ^a (1.29)	3.14 ^{ab} (1.12)	3.24 ^b (1.14)
Minimum price contracts	2.51 ^a (1.18)	3.00 ^b (1.07)	3.15 ^b (0.99)
Off-farm investments	2.55 ^a (1.08)	3.05 ^b (1.18)	2.98 ^b (1.07)

⁹ Importance was evaluated on a Likert-type scale of 1(not very important) to 5 (very important).

¹⁰ Average values for the importance of a response to risk in different years with the same superscript are not statistically different.

Table 5 presents the responses to risk which had statistically significant changes over the period. These were generally associated with marketing responses or government program participation. However, as discussed previously, the change occurred between the 1991 and 1993 surveys rather than after the '96 Farm Bill. The 1997 survey included some additional responses in the marketing area for the first time. Having a written marketing plan rated a 3.19 on the importance scale, and 30 percent of producers had such a plan. The importance of using a marketing consultant was rated at 3.15, and about 44 percent used a consultant. Producing some specialty crops under contract rated a 3.02 on the importance scale, and 39 percent produced specialty crops under contract.

Implications

There are no "right" or "wrong" answers with respect to the ratings of the importance of various sources of and responses to risk. Each producer is in a unique position with respect to risk management. Crop yield and price variability, together with possible incapacity of the operator, are the highest rated sources of risk for many large-scale farmers of the type that attend the TFCW. There are a number of responses which producers can make to manage risk. Common strategies for protecting against these risks include health and liability insurance, being a low-cost producer, using production practices which work under a variety of circumstances, and use of marketing instruments. The sources of risk do change over time, and the responses also change as new risk management tools are developed. For example, in the crop insurance area, new products which ensure revenue, rather than just yield, have become available. Thus, a producer's risk management strategy needs to be dynamic, adapting to a changing business environment.

New Ag Econ Faculty



Gerald Shively

Gerald Shively, an Ohio native, joined the department as an Assistant Professor in August 1996. Since that time he has been active as a teacher, researcher, and advisor. His areas of interest include land degradation and the interface between agriculture and the natural environment. Working with others in the department, he recently completed a study of the proposed Grand Kankakee Marsh National Wildlife Refuge in northwestern Indiana. In addition to his work in Indiana, he is also active overseas. He is currently studying the economics of integrated pest management (IPM) in Bangladesh and the links between government policies and natural resources management in the Philippines. He teaches "Natural Resource and Environmental Economics" at the undergraduate level and is an active and enthusiastic counselor to undergraduate students. He recently supervised an undergraduate "honors" thesis by Jeremy Emmert that was selected as the top undergraduate paper in the nation by the *American Agricultural Economics Association*. Look for a summary of this paper, which investigates patterns of recreation demand at Indiana state parks, in an upcoming issue of PAER.



Gavin Sinclair

Gavin Sinclair joined the department as an Asst. Professor in August 1997. He also has a joint appointment in Organizational Leadership and Supervision. His research interests include process cost economics, the economics of research and development, and supply chain management. He teaches "Organizational Behavior" and "Introductory Economics" at the undergraduate level and "Food Processing Management Simulation" at the graduate level. His recent publications include "What's Experience Got to Do with It" (forthcoming in *Management Science*, with Steven Klepper and Wesley Cohen), "Successfully Solve Combinatorial Problems" (in *Chemical Engineering Progress*, August 1999, with Michael Zentner), and a textbook, *Human Behavior in Organizations* (Prentice Hall-Pearson, 1999, with Dee Cuttell, Rodney Vandevveer, and Michael Menefee). He is currently working on an introductory economics textbook with Robert Taylor and Dee Cuttell.



Mark Leach

Mark Leach joined the department as an Asst. Professor in August 1998. His main focus in teaching and research is agribusiness sales and management. He teaches "Advanced Agri-Sales and Marketing" at the undergraduate level and "International Food and Agribusiness Marketing" at the graduate level.

