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AGRICULTURAL ECONOMICS DEPARTMENT • PURDUE UNIVERSITY

Farmland Values Edge Upward

J.H. Atkinson, Professor and Kim Cook, Research Associate

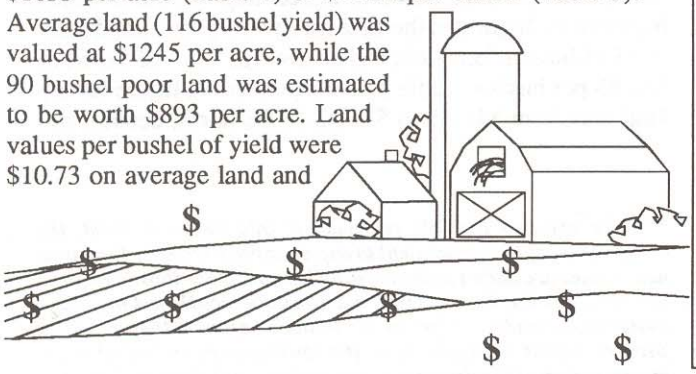
The Purdue land values survey revealed a statewide increase of about 1.8% in the value of average quality bare tillable land in the year ending in June 1991. Early this year, the USDA reported that Indiana farmland values had increased 2% in the year ending in January 1991. The Federal Reserve Bank of Chicago survey of bankers indicated a 3% increase for the year ending in March 1991. This is the fourth year of increasing Indiana land values. According to the Purdue study, top and average land values are 36% above the low levels of 1987.

Statewide Land Prices

The survey showed statewide average increases for the six months ending in June 1991 of 1.6% on top land and 1.4% on average and poor land. These increases are less than were reported for the same period a year ago. Forty percent of the respondents reported that most classes of land increased during the six-month period, 8% reported declines, and 50% felt there was no change in land values. Last year, 64% of the respondents indicated increases in land values and 30% thought they had been stable.

The statewide increase in value for the year ending in June 1991 was 2.8% on top land, 1.8% on average land, and 3.7% on poor land (Table 2). These increases are the smallest since land values turned up in 1987.

Statewide, land with an estimated long-term corn yield of 142 bushels per acre had an average estimated value of $1633 per acre (Table 1) or $11.50 per bushel (Table 3). Average land (116 bushel yield) was valued at $1245 per acre, while the 90 bushel poor land was estimated to be worth $893 per acre. Land values per bushel of yield were $10.73 on average land and $9.92 on poor land. These per bushel figures are $.15 higher than last year on top land, $.09 lower on average land and $.25 higher on poor land.



Transition land moving into nonfarm uses was estimated to have a value of $3163 per acre in June 1991, up 3.5% for the 12 months ending in June (Table 2). Only 37% of the respondents report on transition land values, the range in estimates is quite wide, and the reliability of the averages is not as good as with farmland.

Table 1. Average estimated land value per acre (tillable, bare land) and percentage change by geographic area and land class, selected time periods, Purdue Land Values Survey, Indiana, July 1991.

Area	Class	Corn bu/A	Dec. 1990 $	June 1991 $	Change 12/90-6/91 %	Projected Dec. 1991 $	Projected Change 6/91-12/91 %
North	Top	140	1608	1645	2.3	1667	1.3
	Average	112	1189	1224	2.9	1229	0.4
	Poor	87	834	863	3.5	876	1.5
	Trans.[1]		2578	2713	5.2	2771	2.1
Northeast	Top	137	1454	1467	0.9	1480	0.9
	Average	111	1105	1108	0.3	1114	0.5
	Poor	86	768	771	0.4	775	0.5
	Trans.[1]		3178	3189	0.3	3242	1.7
W. Central	Top	147	1752	1797	2.6	1808	0.6
	Average	124	1373	1399	1.9	1408	0.6
	Poor	96	1006	1020	1.4	1028	0.8
	Trans.[1]		3792	3916	3.3	4364	11.4
Central	Top	147	1749	1767	1.0	1794	1.5
	Average	122	1391	1406	1.1	1426	1.4
	Poor	97	1056	1067	1.0	1079	1.1
	Trans.[1]		3449	3508	1.7	3592	2.4
Southwest	Top	145	1835	1860	1.4	1891	1.7
	Average	117	1314	1331	1.3	1338	0.5
	Poor	90	873	876	0.3	883	0.8
	Trans.[1]		3236	3278	1.3	3209	-2.1
Southeast	Top	129	1109	1115	0.5	1123	0.7
	Average	106	874	879	0.6	886	0.8
	Poor	83	660	663	0.5	669	0.9
	Trans.[1]		2274	2297	1.0	2352	2.4
Indiana	Top	142	1608	1633	1.6	1650	1.0
	Average	116	1228	1245	1.4	1254	0.7
	Poor	90	881	893	1.4	901	0.9
	Trans.[1]		3107	3163	1.8	3239	2.4

1 Land moving out of agriculture.

Statewide Rents Increase Slightly

Cash rents increased statewide from 1990 to 1991 by 1.9% on top land, 1.1% on average land, and 3.1% on poor land (Table 4). The estimate for average land was $88 per acre, $1 more than last year's estimate. Rent per bushel of estimated yield was $.77 on top land, $.76 on average land, and $.74 per bushel on poor land. Cash rent on average land in 1991 was 17% below the record 1981 level and equal to the 1978 estimate (Figure 1).

Statewide cash rent as a percentage of estimated land value was unchanged from 1990 (Table 4). Average figures for both years are slightly below 7% for top land, 7.1% for average land, and 7.5% for poor quality land. In 1979, rent reported for average and top cropland was only 4.8% of the estimated value of the land. Land values fell faster than cash rents in the early 1980s, so that rent as a percentage of average land value rose to 8.1% by 1986 and has fallen a full percentage point since then.

Area Estimates

Farmland value increases from December 1990 to June 1991 were under 1.5% in the northeast, central, southwest, and southeast areas (Table 1). Increases in the north and west central areas were somewhat higher, mostly falling in the range of about 2-3%.

The greatest increase in farmland values from June 1990 to 1991 was 9.4% for top-quality land in the west central area (Table 2). About a third of this increase was due to an average increase in the corn yield which respondents assigned to top-quality land. This yield estimate of 147 bushels per acre is the same as the central area, and land value estimates for all three classes of land in those two areas vary by less than $50 per acre.

Figure 1. Estimated Land Value and Cash Rent, Average Land, 1975 - 1991

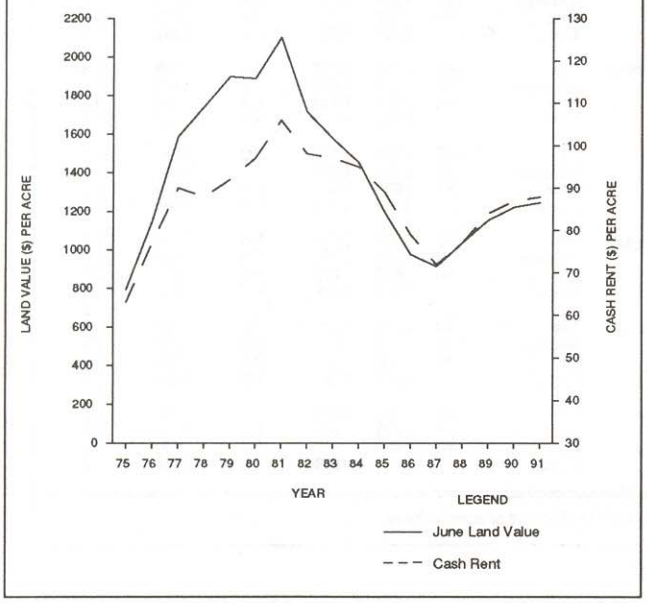


Table 2. June 1990 and June 1991 average estimated land value (tillable, bare land) and percentage change by geographic area and land class, Purdue Land Values Survey, July 1991.

Area	Class	Land Value June 1990 $	Land Value June 1991 $	Change 6/90-6/91 %
North	Top	1581	1645	4.0
	Average	1173	1224	4.3
	Poor	796	863	8.4
Northeast	Top	1543	1467	-4.9
	Average	1116	1108	-0.7
	Poor	748	771	3.1
W. Central	Top	1642	1797	9.4
	Average	1337	1399	4.6
	Poor	953	1020	7.0
Central	Top	1746	1767	1.2
	Average	1446	1406	-2.8
	Poor	1082	1067	-1.4
Southwest	Top	1720	1860	8.1
	Average	1245	1331	6.9
	Poor	832	876	5.3
Southeast	Top	1139	1115	-2.1
	Average	871	879	0.9
	Poor	658	663	0.8
Indiana	Top	1589	1633	2.8
	Average	1223	1245	1.8
	Poor	861	893	3.7
	Trans. [2]	3055	3163	3.5

2 *Land moving out of agriculture.*

Farmland values were strong in the southwest where the 12-month increases ranged from about 5-8%. Increases also were reported in the north, ranging from 4% for top land to 8.4% for poor land.

Three areas of the state, the northeast, central, and southeast, registered slight declines for the year in one or more classes of land. Thus, while the statewide estimates show small increases in farmland values, there are indications of slight declines in some areas of the state.

The percentage increase from the lows of 1987 has been greater in the southwest than in other areas, ranging from 50-55% for all classes of land. In the other areas, top land has increased between 31-41%. This range was greater for average land, 28-45%, and poor land, 31-52%.

Last year, we noted that land with the same yield potential in the southwest* would have a higher per-acre value than land in the central area. Yield estimates increased this year in the southwest and the average per-acre value of top land ($1860) moved ahead of the central area value which had been the highest in the state for several years. Land rated at a 145-bushel corn yield had an average value of $1860 or $12.83 per bushel (Table 3). This per-bushel figure for top land was from $11.75 to $12.22 in the north, central, and

** There are two possible reasons for this increase. First, the composition of the respondent group changes from year to year as new names are added to the mailing list to replace those who drop out of the survey. The new respondents in the southwest may have assigned somewhat higher yields than those whom they replaced. Second, repeat respondents in the southwest have tended to increase their yield estimates on top-quality land from the low level to which they had fallen in 1984 following the 1983 drought.*

Table 3. Land value per bushel of estimated corn yield, Purdue Land Values Survey, Indiana, July 1991.

Area	Land Class								
	Top			Average			Poor		
	1990	1991	% Change	1990	1991	% Change	1990	1991	% Change
North	$11.29	$11.75	4.1	$10.57	$10.93	3.4	$ 9.36	$ 9.92	6.0
Northeast	11.26	10.71	-4.9	10.15	9.98	-1.7	8.80	8.97	1.9
W. Central	11.48	12.22	6.4	11.24	11.28	0.4	10.25	10.63	3.7
Central	11.88	12.02	1.2	12.05	11.52	-4.4	11.39	11.00	-3.4
Southwest	12.37	12.83	3.7	11.02	11.38	3.3	9.35	9.73	4.1
Southeast	9.04	8.64	-4.4	8.38	8.29	-1.1	7.93	7.99	0.8
Indiana	11.35	11.50	1.1	10.82	10.73	-0.8	9.67	9.92	2.6

west central areas, $10.71 in the northeast, and $8.64 in the southeast. The per-bushel figures declined as land quality declined.

In all areas except the southwest, per-acre rents for top and average land typically increased a dollar or two from 1990 to 1991 (Table 4). Increases of $5 to $7 per acre partly reflect the upgrading of average yields in the southwest.

Although land values were highest in the southwest, cash rents were highest in the west central area, $128 per acre on top-quality land or $.87 per bushel. In the north, west central, and central areas, per-bushel rents ranged from $.76 to $.87. The range in the southwest and northeast was from $.69 to $.76 per bushel, and in the southeast, $.59 to $.64. As land quality declined, rent per bushel also declined, although there was little difference in the rent per bushel on top and average land. Interestingly, budget analysis indicates that in many situations, $.10 per bushel or more could be justified for top-quality land over average-quality land.

Cash rent as a percentage of the value of top and average land fell slightly in the north and west central areas. In the other areas, there was a mixture of increases, decreases, and no change. These area average percentages fell in the range of 5.9-7.9%. For many years prior to the early 1970s, cash rent as a percentage of Indiana land values generally fell in the range of 6-8%; however, by 1979, this percentage had fallen below 5% on a statewide basis. With falling land values, the percentage rose, peaking in 1986 with a state estimate of over 8% on average land. We are now back in the "thumb rule" range of 6-8%.

Respondents' Outlook

There was a decline from last year in expectations for short-run increases in farmland values. Only 39% of the respondents expect some or all classes of land to increase, down from 62% last year. The average amount of increase was also smaller — 0.7% for average land (Table 1) versus 1.6% last year. Under 10% expected declines in some or all classes of land, while over half expected no change. Small increases mostly under 1.5% were expected in all areas of the state.

Seventy-eight percent of the 1991 respondents expect land values to be higher five years hence. This year, the group expected an average increase of 9% for the five-year period, down from 13% last year.

Table 4. Average estimated cash rents, bare tillable land, 1990 and 1991, Purdue Land Values Survey, Indiana, July 1991.

Area	Class	Corn bu/A	Rent/Acre		Percent Change 90 to 91	Rent/bu. of Corn		Rent as a % of June Land Value	
			1990 $	1991 $	%	1990 $	1991 $	1990 %	1991 %
North	Top	140	111	112	0.9	.79	.80	7.0	6.8
	Average	112	87	88	1.1	.78	.79	7.4	7.2
	Poor	87	62	66	6.5	.73	.76	7.8	7.6
Northeast	Top	137	97	98	1.0	.71	.72	6.3	6.7
	Average	111	75	77	2.7	.68	.69	6.7	6.9
	Poor	86	57	58	1.8	.67	.67	7.6	7.5
W. Central	Top	147	125	128	2.4	.87	.87	7.6	7.1
	Average	124	105	104	-1.0	.88	.84	7.9	7.4
	Poor	96	80	81	1.3	.86	.84	8.4	7.9
Central	Top	147	119	121	1.7	.81	.82	6.8	6.8
	Average	122	99	100	1.0	.83	.82	6.8	7.1
	Poor	97	79	79	0.0	.83	.81	7.3	7.4
Southwest	Top	145	103	110	6.8	.74	.76	6.0	5.9
	Average	117	79	85	7.6	.70	.73	6.3	6.4
	Poor	90	57	62	8.8	.64	.69	6.9	7.1
Southeast	Top	129	82	83	1.2	.65	.64	7.2	7.4
	Average	106	66	66	0.0	.63	.62	7.6	7.5
	Poor	83	49	49	0.0	.59	.59	7.4	7.4
Indiana	Top	142	108	110	1.9	.77	.77	6.8	6.7
	Average	116	87	88	1.1	.77	.76	7.1	7.1
	Poor	90	65	67	3.1	.73	.74	7.5	7.5

Respondents were asked to estimate annual averages over the next five years for corn and soybean prices, the farm mortgage interest rate, and the rate of inflation. The projections they made in each year since 1984 are shown below:

	Prices, $/bu		Rates, %/yr	
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

Lower corn and bean price expectations probably were influenced by declines in these prices reflecting late spring expectations of bumper crops. Even these lower expectations are higher than they were in 1987 when several years of declines in both land values and corn and bean prices ended. Interest rate expectations dropped from 11% last year to 10.4%, the lowest level since this question was first asked in 1983. The expectations for inflation declined to 4.2%, a figure lower than was reported in eight of the past 10 years. The difference between the interest rate and the inflation rate, sometimes used as a rough measure of the "real" interest rate, was 6.2, slightly lower than it has been in the past three years.

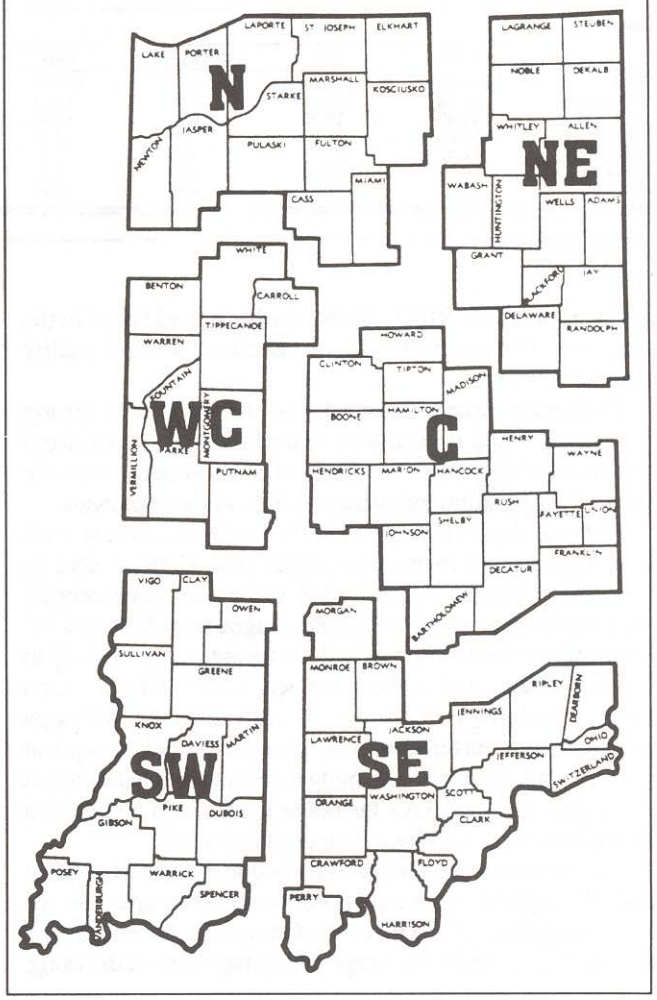
Current farm mortgage interest rates as low as 10% or less are favorable relative to rates over most of the past decade or more and may provide some stimulus to the demand for farmland.

Our Views of the Future

At the time this survey was conducted in June, bumper crops were in prospect, corn and bean prices had drifted downward, and a leveling off or decline in farmland prices appeared likely. But by mid to late July, dry weather in major production areas of Indiana, Illinois, and Ohio raised the possibility of significant reductions in U.S. production of corn and beans. As of this writing, the extent of drought damage is uncertain. There is uncertainty with regard to prices and the extent of reductions in previous expectations of fall stocks of corn and beans. This uncertainty extends to the future direction of farmland values. Some farmers in some areas of Indiana will suffer such low yields that higher corn and bean prices will not prevent financial stress. Some farmers will be forced to sell land and in areas hard hit by the drought, prices may decline, at least in the short run.

On the other hand, many Indiana farmers will have crop incomes equal to or higher than their earlier expectations if the drought reduces overall yields sufficient to boost expectations of harvest-time prices well above the earlier $2 level for corn and $5 or less for beans. In areas where yields are fairly good, some strength could develop in land prices. If U.S. yield estimates drop to levels which indicate carryover stocks this fall of under a billion bushels of corn and under 200 million bushels of beans, price expectations for 1992 and beyond likely would be improved considerably over the expectations of last spring and early summer. This raises the possibility of additional strength in the land market, at least until next summer's assessment of 1992 yields. In summary, we are suggesting some short-run weakness in land values in areas hard hit by drought, but with the possibility of widespread modest strength after harvest.

Figure 2. Geographic Areas Used in the Purdue Land Values Survey



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The land values survey was made possible by the cooperation of professional farm managers, appraisers, brokers, bankers, and persons representing the Farm Credit System, the Farmers Home Administration, ASCS county offices, and insurance companies. Their daily work requires that they keep well-informed about land values and cash rent in Indiana. To these friends of Purdue and Indiana agriculture, we express our sincere thanks. They provided over 400 responses representing most of Indiana's counties. Thanks also to Kelly Neskov of the Department of Agricultural Economics for her help in conducting the survey and to Ag Econ professors Chris Hurt and Don Pershing for their review of this report and helpful suggestions.

1991-92 Outlook Meetings Schedule

Sponsored by Purdue Cooperative Extension Service

County	*Person*	*Date*	*Time and Place*
Adams/Steuben	Atkinson	Sept. 24	7 pm 4-H Bldg., Monroe
Allen	Hurt	Sept. 20	7 am Richard's Restaurant, New Haven
Benton	Uhrig	Sept. 18	7:30 am Benton County 4-H Bldg.
Blackford	Atkinson	Sept. 19	7 am 4-H Bldg., Hartford City
Boone	Schrader	Sept. 10	7 am 4-H Fairgrounds, Lebanon
Carroll	Uhrig	Sept. 17	Evening
Cass	Uhrig	Sept. 16	8 am 4-H Community Center
Clark	Hurt	December 10	7:30 am Clark Co. Fairground, Charlestown
Clay/Vigo	Foster	Sept. 16	7:30 am Jackson's Bluebonnett, Brazil
Clinton	Hurt	Sept. 17	7:30 am 4-H Community Bldg., Frankfort
Crawford/Harrison	Hurt	December 11	7:30 pm N Harrison HS, Ramsey
Daviess	Schrader	Sept. 11	11:30 am Ponderosa, Washington
Delaware	Atkinson	Sept. 18	Evening
Elkhart	Schrader	Sept. 16	Evening
Fayette	Schrader	Sept. 26	Evening
Fountain/Warren	Foster	Sept. 18	Breakfast
Fulton	Uhrig	Sept. 25	Breakfast
Grant	Hurt	Sept. 25	Breakfast
Hamilton	Hurt	Sept. 24	Breakfast
Hancock	Ellis	Sept. 16	7 am 4-H Bldg., Greenfield
Hendricks	Atkinson	Sept. 20	Breakfast
Henry	Atkinson	Sept. 18	Breakfast
Huntington	Schrader	Sept. 16	7:30 am Huntington College Commons
Jackson	Foster	Sept. 23	8 am Seymour Elks Club
Jasper	Uhrig	Sept. 24	Evening
Jay	Atkinson	Sept. 26	7:30 am Richard Restaurant, Portland
Johnson	Uhrig	Sept. 20	7 am Franklin College, Lilly Center
Kosciusko	Schrader	Sept. 17	7:30 pm Justice Bldg., Warsaw
Lagrange	Schrader	Sept. 19	7:30 pm Prairie Heights School
Madison	Hurt	Sept. 18	7:30 am Madison Co. 4-H Fairgrounds
Martin	Hurt	Sept. 23	Evening
Montgomery	Hurt	Sept. 19	Breakfast
Newton	Atkinson	Sept. 10	Evening
Orange	Hurt	December 10	7:00 pm Easterday Bros., Bromer
Porter	Schrader	Sept. 18	7:30 am Farm Bureau Ins. Bldg., Valparaiso
Posey	Schrader	Sept. 11	5 pm Marvin Redman Farm
Pulaski	Hurt	Sept. 16	7:30 am Pulaski Co. 4-H Fairgrounds
Putnam	Foster	Sept. 17	6 am Community Bldg., Fairgrounds
Randolph	Atkinson	Sept. 17	7:30 pm FB Insurance Board Rm.
Rush	Schrader	Sept. 26	Breakfast
Scott	Hurt	December 11	7:30 am Best Western, Scottsburg
Shelby	Uhrig	Sept. 16	7:30 pm Women's Bldg., Fairgrounds
St. Joseph/Marshall	Schrader	Sept. 18	7:30 pm Laville High School
Sullivan	Hurt	Sept. 26	7 am Fairgrounds, Sullivan
Switzerland	Uhrig	Sept. 20	Lunch
Vermillion/Parke	Schrader	Sept. 13	7:30 am Janet's Family Rest., Montezuma
Warrick	Schrader	Sept. 12	6:30 am
Washington	Foster	Sept. 24	6:30 am Salem Lions Club
Wayne	Atkinson	Sept. 17	7 am Lands End, Hagerstown
Wells	Atkinson	Sept. 25	7 am 4-H Park, Bluffton
White	Uhrig	Sept. 19	7:30 am 4-H Bldg., Reynolds

Liquid Fertilizer Spills in Indiana

*Curt Krueger, Graduate Student; Steve Lovejoy, Associate Professors; Deb Brown, Associate Professor**

Accidental spills of farm chemicals can occur during mixing or transporting or from storage tank leaks. In response to concerns about possible damage to Indiana's water quality, the legislature asked the State Chemist's Office to propose a set of rules for fertilizer storage. (Rules already exist for pesticides.) The rules were published in the *Indiana Register* in September 1990. Effective in 1991, these rules call for a large basin or dike to be constructed around fertilizer storage tanks, as well as a pad for loading and mixing. While the potential for groundwater contamination is real, the costs of such containment are also significant. This article describes the fertilizer spills which occurred in Indiana since 1985 that helped motivate these new rules.

What Spilled?

Indiana's Department of Environmental Management (DEM), which monitors spills, has collected data on agricultural chemical spills since 1985. (See Table 1.) The data include the year, month, party responsible, where the spill occurred, the material spilled, the volume spilled, and whether or not the spill was contained. This information is available to the public at the office of the DEM.

Of the 560 spills reported to DEM in this four and one-half year period, approximately half were contained. Contained spills most likely occurred at a storage site, rather than in transport, and are therefore most likely to be affected by the new rules. We will therefore focus on contained spills. We will also focus on liquid spills, since liquids are more likely to rapidly reach and contaminate water than are dry materials.

The Association of American Plant Food Control Officials (AAPFCO) lists 645 fertilizer manufacturers, blenders, and retail outlets in Indiana. Thirty-eight percent of these plants provided AAPFCO with information on the materials they handled. Assuming these plants are representative of all the plants in Indiana, 95% handle liquid fertilizer. Nitrogen solutions accounted for 52% of total liquid fertilizer storage, phosphorous solutions for 21%, anhydrous ammonia for 8%, and finished product and phosphoric acid for the rest.

Table 1. Breakdown of Indiana Agricultural Chemical Spills Reported to DEM Between January 1985 and July 1990 by Material.

	Total	Contained	% Contained
Fertilizer[1]	257	138	53.70%
Chemical	164	101	61.59%
Ammonia	66	4	6.06%
Acid	2	1	50.00%
Mixtures	49	30	61.22%
Unknown	22	5	22.73%
Total	560	279	49.82%

1 Includes both liquid and dry fertilizer.

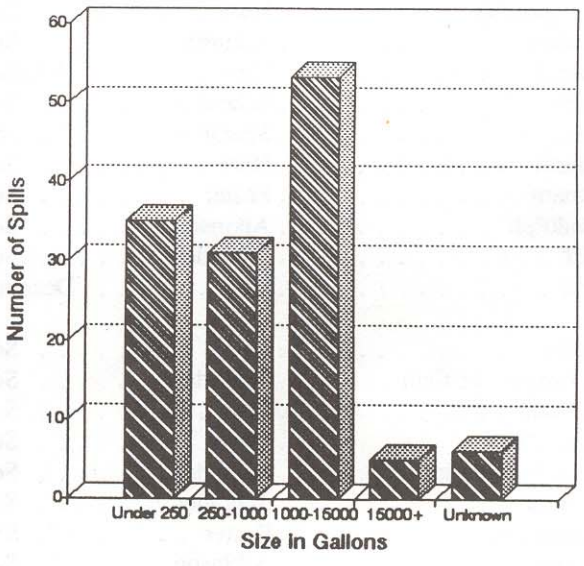
How Much Spilled?

In the early years, not all spills were reported to the Department of Environmental Management. An increasing percentage of total spills has been reported over time. There were 130 contained liquid fertilizer spills in Indiana reported to the DEM between January 1985 and July 1990. The volume of six of these spills is unknown. The total known spill volume was 305,788 gallons. The average volume per spill was 2,466 gallons, but reported spills varied from one gallon to 30,000 gallons. Figure 1 shows a distribution of reported contained liquid fertilizer spills by size.

Where Did It Spill?

Figure 2 shows the number and average contained liquid fertilizer spill size by county. As one would expect, the spills were not evenly distributed over Indiana, but were concentrated in counties with larger farming sectors. Spills were also more likely to occur in the spring planting season from April to June.

Figure 1. Number of Reported Liquid Fertilizer Spills in Indiana by Size, Jan. 1985 to July 1990



* *The authors would like to express thanks to the Indiana Department of Environmental Management for their assistance.*

How Costly Are Spills?

Spills are expensive for the farmer or dealer to clean up. Preliminary estimates of clean-up costs for liquid fertilizer spills run up to $5,200 for a spill of less than 250 gallons. There is one reported case of a 40,000-gallon spill that had, so far, cost $100,000 in clean-up costs.

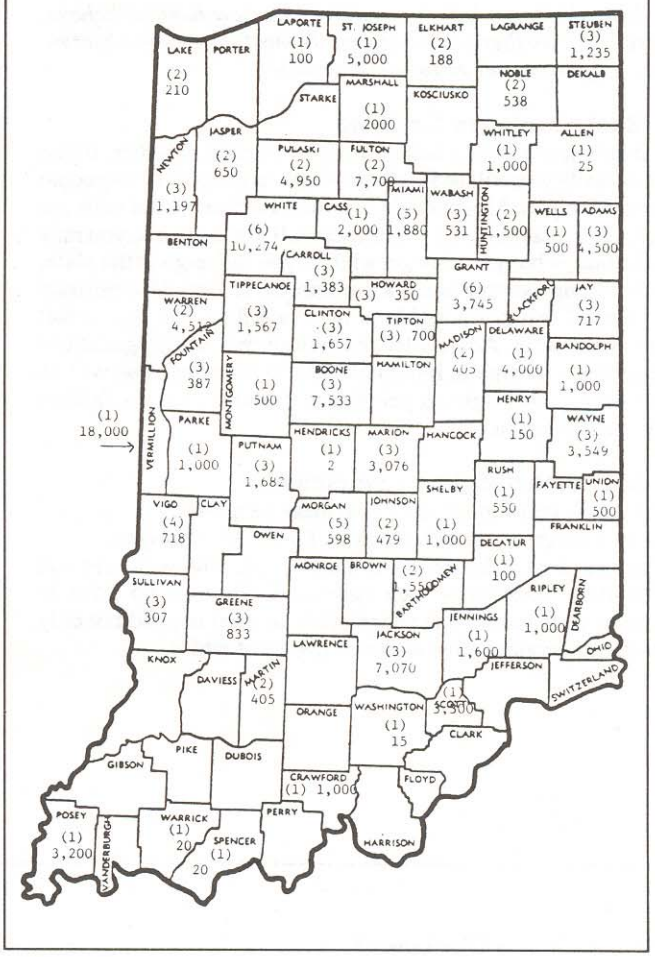
Very preliminary estimates of costs and benefits from the new containment rules (Krueger, 1991) indicated that savings to dealers from expected reductions in direct clean-up costs would not quite equal the cost to them of the new containment system. However, these direct clean-up costs did not include the cost of an emergency response team if that were necessary, the payment for fish killed, or the cost from subsequent legal action. An emergency response team can cost $1,000 plus $750-$1,000 per hour for a team of three to four persons. Fish kill is frequently associated with fertilizer spills, and this cost can be significant. We do not have data on the cost of subsequent legal action.

There are costs to society as well as to farmers and dealers. Other research at Purdue (Lovejoy, *et al.*, 1989) illustrated that very small changes in water quality parameters can have major costs. A change in water quality of 1-15% resulted in an estimated decrease in benefits of Indiana recreational fishing by $2-$20 million dollars per year. While estimating the recreational fishing benefits of averting a specific spill is quite difficult, the aggregate value could run into millions of dollars. Adding other benefits like aesthetics, boating, swimming, and so on, would push the benefits of avoiding such a spill even higher. Any effect on human health would push the cost to society higher yet.

However, to put the spill volume numbers in perspective, it is useful to remember that there were 5,379,000 tons of liquid fertilizer used in Indiana between 1985 and 1989 (Tennessee Valley Authority Economics and Marketing Staff). Assuming 10.5 lbs. per gallon, and 2,000 lbs. per ton, the contained liquid fertilizer spilled between 1985 and 1989 (276,182 gallons) represented less than 3/100 of 1% of the total liquid fertilizer used in that period in Indiana.

While the cost of containment systems is significant, the new rules for fertilizer storage should help reduce the costs of clean-up after spillage and the potential for contamination of Indiana water.

Figure 2. Number ( ) and Average Size in Gallons of Reported Contained Liquid Fertilizer Spills, Jan. 1985 to July 1990



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Purdue Ag School Facts

Can you name the programs with the highest undergraduate enrollment this past spring?

		% of All Ag Students
#1	**Ag. Economics**	18.4%
2.	Forestry	15.6%
3.	Landscape Architecture	13.0%
4.	Animal Science	9.2%
5.	Pre-Vet Medicine	8.9%

Some Essential Truths About Human Economic Behavior

Don Paarlberg, Professor Emeritus

Note: Volumes have been written on how humans behave. Here Dr. Paarlberg summarizes his most important observations regarding our economic behavior.

1. Most people are forgiving,
so it is best not to fear failure, financial, social, or other. If you fail, usually you will be forgiven — unless you pull other people down with you. Most people are conservative, so the odds are weighted in favor of the venturesome. If you go to bat, you may strike out — but you may get a hit! If you fail to go to the plate, your batting average is not a thousand, it is zero. Demonstrate to yourself that it is possible to survive failure. Recognize that you are fallible. Acknowledged failure (not self-flagellation) generates a warmth in interpersonal relationships. You will be amazed at how forgiving people are. Frustration is not failure; low aim is failure.

2. But some people are vindictive.
You don't know in advance who these people are. So take care not to impugn a person's motives. Don't cut off anyone's line of retreat. If you do, there are some people who will fight you with every weapon at their command. There is no point in making your battles that rough. This counsel is good not only for things economic but also as a matter of ethics.

3. Opportunity costs should be governing.
Before you buy that new combine, think about what you might otherwise do with the money. Remember Ben Franklin's story about how, as a boy with a few pennies in his pocket, he bought a toy whistle, which to him was the greatest thing in the world. After blowing it a few times, he tired of it. His money gone and the novelty of his toy worn off, he concluded that he had paid too much for his whistle.

4. Human nature has a large element of continuity.
When you hear of a proposal, ask yourself this question: "For this to succeed, does it take a fundamental change in human nature?" If it does, look on the proposal with misgiving. Some individuals experience fundamental change; but for the society as a whole, such changes come only by very small increments.

5. The principle of diminishing returns applies to money.
Except for the miserly and avaricious, a dollar added to the income of a person who is already wealthy has less utility to him than an incremental dollar adds to the utility of one who is poor. Anyone who has seen a hungry man will confirm this fact. Other things being equal, the less dispersion of wealth between rich and poor, the greater is the total utility that accrues to the country's people. Remember this when you pay taxes to increase opportunities for those on the bottom rungs of the economic ladder. You can't take it with you. There is little merit in being the richest person in the cemetery.

IN THIS ISSUE

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