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Results of the Indiana Farm Finance Survey for 1992*

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Key indicators from the Indiana Farm Finance Survey for 1992 suggest financial conditions for many Hoosier farmers deteriorated from 1991 to 1992. In particular, the delinquency rate for nonreal estate loans, debt-asset ratios, and percentage of respondents turned down when applying for a loan all increased to levels higher than those recorded for 1991. Farmers continued to adopt management practices that increase their efficiency and reduce costs. Respondents indicated they plan to continue this practice during the next 12 months.

Indiana Farm Finance Surveys were conducted in the March-June time period in 1985, 1986, 1988, and 1990-1992, by the Departments of Agricultural Economics and Agricultural Statistics at Purdue University. An abbreviated survey of a smaller sample was conducted in February-March 1989. This article reports on the 1992 survey, compares the 1992 results to the findings for 1991 and to selected findings for 1986, 1988-1990, and describes the financial condition of Indiana farmers.

Procedure

In March 1992, a farm finance questionnaire was sent to about 5,000 Indiana farmers by the Department of Agricultural Statistics at Purdue University. Approximately 1,000 farmers who had responded to the 1991 farm finance questionnaire were included in the sample, together with a random sample of an additional 4,000 farmers. Approximately three weeks after the initial mailing, a reminder questionnaire was mailed to farmers who had not yet responded to the mail questionnaire. In May 1992, a telephone survey of 311 nonrespondents was conducted mainly to determine if the characteristics of the farmers who did not respond to the mail questionnaire differed from those who responded. Such an investigation helped to determine if the mail questionnaires produced a representative sample, particularly whether

nonrespondents were in worse financial condition than respondents. The respondents to the telephone survey farmed slightly fewer acres (315) than respondents to the mail survey (332). In general, financial measures were, for the most part, better for telephone respondents than for mail respondents; the delinquency rate for real estate and nonreal estate loans, percentage turned down when applying for a loan and percentage with debt-asset ratios exceeding 70% were all slightly lower for telephone respondents. No other differences in characteristics could be detected in the responses obtained by telephone. Hence, the results obtained by telephone were included with those obtained by mail questionnaires to produce the summaries appearing in this article. The number of questionnaires containing completely usable or partially usable responses was 1,470 for a response rate of 29%.

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However, as noted in the summary tables, the number of usable responses varied substantially from question to question.

Many results are reported below as averages for Indiana and for the northern, central, and southern regions of the state (Figure 1). The northern region consists of the counties in the northwestern, north central, and northeastern agricultural statistics districts. The central region includes counties in the west central, central, and east central agricultural statistics districts. Counties in the southwestern, south central, and southeastern agricultural statistics districts make up the southern region. State averages are weighted by the number of responses for each region.

Data from the balance sheets of respondents are as of January 1, 1992. The data on loan delinquencies and loan turndowns are as of the spring of 1992. The data on farm and off-farm income are for calendar year 1991.

Background Statistics on Characteristics of Respondents

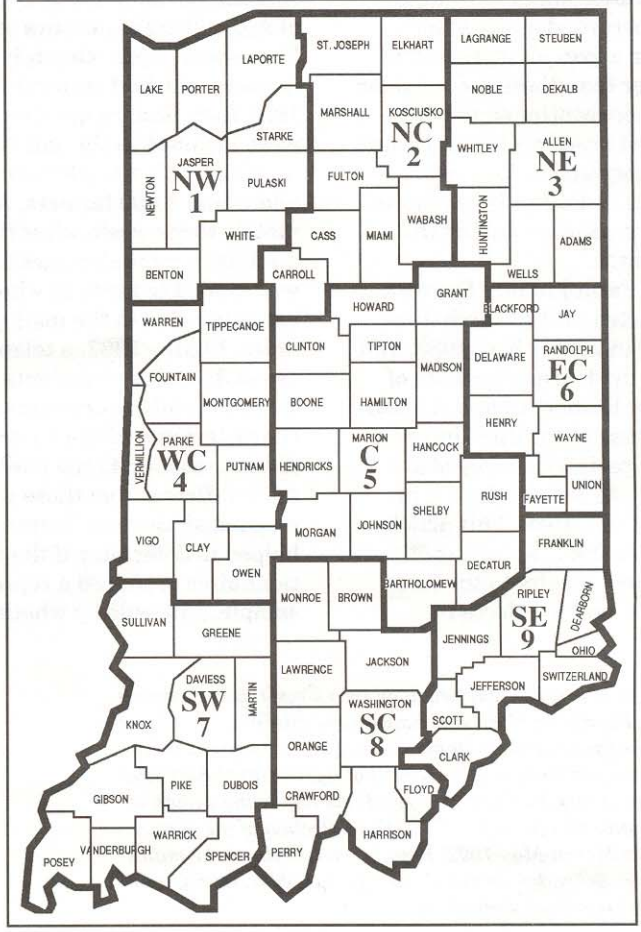
The background statistics appearing in Table 1 were used for assessing the representativeness of the sample

Table 1. Respondents' age, experience as farm operator, and acres farmed 1991 and 1992.

Characteristics of respondents	North 1992	Central 1992	South 1992	State 1991	State 1992	Number of usable responses in 1992[1]
Operator age (years)	52.3	52.7	51.6	51.8	52.2	1,345
Years as farm operator	26.6	25.8	24.1	25.6	25.6	1,313
Acres in farming operation						
a. Owned	166.4	151.2	160.9	188.9	159.9	
b. Rented from others	208.1	204.2	106.6	202.0	176.5	
c. Rented to others	5.5	10.8	6.9	7.1	7.7	
Total acres operated (a + b - c)	369.0	344.6	260.6	383.8	328.7	1,175

1 Some responses for items were not usable because of missing numbers and inconsistencies.

Figure 1. Geographic Regions Used in the Cross-state Comparisons of the Indiana Farm Finance Survey Data, 1992.



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and for making certain cross-tabulations reported later. The average age and average number of years of experience as a farm operator of respondents were 52 and 26 years, respectively, and did not vary substantially either across the three regions of the state or from the results of the 1991 survey (Table 1). The 329 average acres operated by respondents in 1992 was 55 fewer than the 384 acres operated by respondents in 1991. As expected, the average acres operated by respondents in northern (369) and central (345) Indiana was greater than the 261 average acres in southern Indiana. The 160 average acres owned by respondents in 1992 was 29 fewer than the 189 average acres owned by respondents in 1991.

Measures Describing the Financial Condition of Indiana Farmers

Several statistics from the Farm Finance Survey are used to draw inferences about the financial condition of Indiana farmers. Gross and net farm income, debt-asset ratios, delinquency rates for loans, loan rejection rates, and principal payments in addition to scheduled payments statistics are used in this section to examine the general financial condition of Indiana farms.

Gross and Net Farm Income. Gross farm income is the income generated by a farm before any expenses are subtracted. A gross farm income value of $100,000 was selected to differentiate between part-time and full-time farms. About 22% of the respondents had gross farm incomes over $100,000 and 78% had gross farm incomes under $100,000 in 1991 (Table 2). The comparable figures for 1990 regarding full-time and part-time farmers were 30% and 70%, respectively. In southern Indiana, 16% of the respondents had gross farm incomes in 1991 greater than $100,000, compared to 24% and 25% in central Indiana and

Table 2. Percentage of all respondents in gross and net farm income categories, 1990 and 1991; and percentage of respondents with gross farm income (GFI) $100,000 and over in gross and net farm income categories, 1990 and 1991.

	All Respondents					Respondents with GFI $100,000 and over	
	North	Central	South	State		State	
Farm income category[2]	1991	1991	1991	1990	1991	1990	1991
Gross income categories				percentage			
Less than $10,000	18.1	23.4	36.8	22.0	25.5	0	0
$10,000 to $39,999	30.9	30.3	32.4	27.3	31.2	0	0
$40,000 to $99,999	25.6	22.7	15.3	20.8	21.5	0	0
$100,000 to $249,999	16.5	19.0	11.9	20.6	15.9	68.9	72.8
$250,000 to $499,999	7.2	3.4	2.6	6.6	4.6	22.2	21.1
$500,000 and over	1.7	1.2	1.0	2.7	1.3	8.9	6.1
Totals	100.0	100.0	100.0	100.0	100.0[3]	100.0	100.0[6]
Net cash farm income categories							
Net Loss	19.2	23.0	26.7	16.8	22.7	4.0	10.7
$0 to $4,999	22.8	24.1	32.5	24.5	26.1	2.7	3.4
$5,000 to $9,999	12.5	15.3	15.8	13.7	14.4	4.7	3.0
$10,000 to $19,999	19.6	11.6	10.0	13.7	14.2	9.9	14.1
$20,000 to $49,999	19.2	20.4	11.4	20.1	17.2	42.9	44.5
$50,000 and over	6.7	5.6	3.6	11.2	5.4	35.7	24.3
Totals	100.0	100.0	100.0	100.0	100.0[4]	99.9	100.0[7]
Net farm income categories							
Net Loss	26.6	32.8	34.7	23.8	31.1	8.8	14.6
$0 to $4,999	24.0	24.0	33.5	25.5	26.9	6.8	6.1
$5,000 to $9,999	14.3	10.2	13.3	13.8	12.7	6.8	7.7
$10,000 to $19,999	16.7	14.7	9.7	15.4	13.9	19.0	20.7
$20,000 to $49,999	13.8	15.5	6.3	14.8	12.1	36.8	36.2
$50,000 and over	4.6	2.8	2.4	6.8	3.4	21.8	14.6
Totals	100.0	100.0	99.9	100.1	100.1[5]	100.0	99.9[8]

2 *Income categories were defined to include income obtained from government payments. Net cash farm income equals total cash receipts minus total cash expenses. Net farm income equals net cash farm income minus depreciation.*

3 *1992 usable responses were 1,277.*

4 *1992 usable responses were 1,186.*

5 *1992 usable responses were 1,098.*

6 *1992 usable responses were 279.*

7 *1992 usable responses were 263.*

8 *1992 usable responses were 246.*

NOTE: Totals may not add to 100.0 due to rounding.

in northern Indiana, respectively. This suggests that the central and northern regions of Indiana have a larger share of large-scale operations.

Operators of many small, part-time farms in Indiana obtain large percentages of their incomes from nonfarm sources. Only 20% of the operators of farms with gross farm incomes of $100,000 and over work at an off-farm job. Because the financial characteristics of part-time farms differ from those of full-time farms, certain statistics will be presented separately in the article for farmers with gross incomes of $100,000 and over per year.

Respondents reported net cash farm income and net farm income figures for 1991. For purposes of the survey, net cash farm income was defined as total cash receipts minus total cash operating expenses. Net farm income was defined as net cash farm income minus depreciation. Neither of the two measures of farm income is adjusted to reflect changes in inventories.

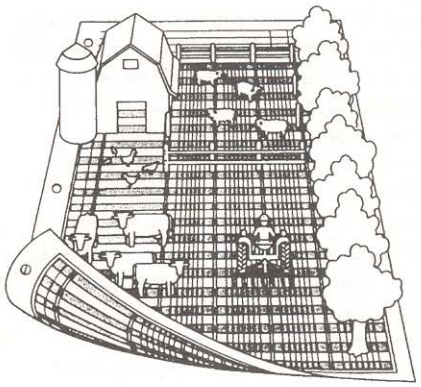
Net farm income is commonly defined as the return to unpaid operator and family labor, management, and equity capital. Net cash farm income represents the amount of money available to farmers to repay the principal on intermediate and long-term debt, purchase capital assets, pay family living expenses, pay income taxes, and retain in the farming operation as a financial reserve.

The impact of the 1991 drought can be seen by examining the earnings of respondents. About 23% of the respondents reported negative net **cash** farm incomes for 1991; and about 31% of the respondents reported negative net farm incomes (Table 2), compared to 17% and 24%, respectively, in 1990. The percentage of respondents reporting net losses in 1991 was largest in southern Indiana. The percentage of respondents with $100,000 gross farm income (GFI) and over reporting net farm incomes in the net loss category is 14.6%, up considerably from 8.8% in 1990.

About 85% of all respondents had net farm incomes of less than $20,000 in 1991, compared to 78% in 1990. The percentage of respondents with $100,000 GFI and over reporting net farm incomes less than $20,000 is 49%, compared to 41% in 1990. Given current levels of family living expenses, many of these farmers probably would have had difficulty making debt payments from 1991 net farm incomes. Of course some could have made debt payments using depreciation allowances and income obtained from nonfarm sources.

Many Indiana farmers supplement farm income with income from off-farm sources. The average gross off-farm income for all operators reporting off-farm income was $29,800.

Balance Sheet Information Used to Obtain Measures of Solvency. A balance sheet is a financial picture of an individual or firm at a point in time which shows assets (what is owned), liabilities (what is owed), and owner equity. Respondents were asked to provide an estimate of their nonreal estate and real estate assets and liabilities as of January 1, 1992. A word of caution should be extended about the reliability of the asset values reported. The value of total assets is the average amount reported by each respondent and no mechanism was employed for checking the accuracy of these estimates. Hence, the real



estate and farm machinery values which made up a large portion of each respondent's balance sheet are subject to the possible biases, evaluation methods, and market knowledge levels of the individual respondents.**

The average value of farm real estate assets reported by respondents as of January 1, 1992 was $237,950, ranging from $202,049 in southern Indiana to $289,023 in northern Indiana (Table 3). The average value of farm real estate assets reported by respondents with gross farm income (GFI) $100,000 and over was $467,245. Farm nonreal estate assets averaged $119,247 in value for the state, exhibiting their lowest value ($104,960) in southern Indiana and their highest value ($140,481) in northern Indiana. Farm nonreal estate assets averaged $241,062 for farmers with GFI $100,000 and over.

For all respondents, the average amount of real estate debt was $54,377, ranging from $37,252 in southern Indiana to $71,567 in northern Indiana. The average amount of real estate debt for farmers with GFI $100,000 and over was $133,031. The nonreal estate debt (state average) was $26,872, varying from $23,849 in southern Indiana to $31,132 in northern Indiana. The average amount of nonreal estate debt for farmers with GFI $100,000 and over was $73,546.

The owner equity (total assets minus total liabilities) of respondents averaged $275,948 for the state. It was highest in northern Indiana ($326,805) and lowest in central Indiana ($242,612) (Table 3).

*** Caution should be used when comparing the real estate value reported by respondents in 1992 to the values reported in 1991. All respondents in 1992 owned an average of 29 fewer acres than in 1991. Also, caution should be used when comparing real estate values calculated on a per acre basis to values in 1991 and to the values reported from the Purdue land values survey. The real estate value reported in the farm finance survey includes both tillable and nontillable land, the residence, buildings and improvements. The land value reported in the Purdue land values survey is for tillable, bare land.*

The average owner equity of respondents with GFI $100,000 and over was $501,730. Caution should be used when comparing owner equity figures for 1992 to figures for 1991, because of the impact of farm real estate values on owner equity.

The percentage of all respondents carrying real estate and nonreal estate debt in 1992 and the average interest rates paid by the respondents on the debt are listed in Table 3. Note that about 40% of all respondents reported zero debt in 1992. This zero debt figure is about 2.5 percentage points higher than the comparable number for 1991. About 43% of the respondents in southern Indiana reported they had no debt on January 1, 1992. About 15% of the respondents with $100,000 and over of gross farm income had zero debt in 1992, which is equal to the figure reported in 1991 and considerably lower than the percentage of all respondents.

Nearly 39% of the respondents made principal payments on real estate loans in addition to scheduled payments during the past year. The comparable figure was 46% for nonreal estate loans. Respondents with GFI $100,000 and over also paid ahead; about 36% and 44% made principal payments in addition to scheduled payments on real estate and nonreal estate loans, respectively.

For Indiana, respondents reported they paid interest rates on real estate and nonreal estate debt in 1992 which averaged 8.9% and 9.9%, respectively. For respondents with $100,000 GFI and over, the interest rates on real estate and nonreal estate debt in 1992 averaged 8.7% and 9.1%, respectively.

Solvency measures describe the amount of money a farmer would have remaining after all assets are converted to cash and debts retired. Solvency ratios measure the relationship between claims on the business (liabilities) and either total assets or owner equity. Interpretation of the debt-asset ratios obtained in this survey as an indicator of the financial condition of Indiana farmers requires caution. The total debt component of the ratio (liabilities) does not take into account how the debt is structured. Debt structure impacts farmers' ability to service debt, and consequently, their financial condition.

Problems discussed earlier about the difficulty of establishing farm asset values also impact the reliability of the debt-asset ratio. Calculations of change in owner equity can be the result of a profit or loss in a previous year and/or the result of an increase or decrease in the asset values. Such a change also influences the ratio. Without an income statement and the knowledge of asset values on the previous balance sheet, it is difficult to identify the reasons for

Table 3. Balance sheet, debt, loan repayment, interest rate, delinquency rate, and loan rejection rate information for all respondents, 1991 and 1992; and for respondents with gross farm income (GFI) $100,000 and over, 1992.

	Average value of characteristics for all respondents					For respondents with GFI $100,000 and over
	North	Central	South	State		State
Item	1992	1992	1992	1991	1992	1992
Balance sheet information:						
Real estate assets ($)	$289,023	$209,964	$202,049	$303,187	$237,950	$467,245
Nonreal estate assets ($)	140,481	107,003	104,960	134,298	119,247	241,062
Real estate liabilities ($)	71,567	49,787	37,252	62,863	54,377	133,031
Nonreal estate liabilities ($)	31,132	24,568	23,849	29,674	26,872	73,546
Owner Equity ($)	326,805	242,612	245,908	344,948	275,948	501,730
Debt (liability)/asset ratio (%)	23.9	23.5	19.9	21.2	22.7	29.2
Percentage of respondents with:						
Real estate debt	50.6	49.9	47.4	51.1	48.8	71.6
Nonreal estate debt	43.3	43.1	37.0	43.3	41.3	70.0
No real estate or nonreal estate debt	38.1	38.7	43.3	37.3	39.8	14.8
Percentage of respondents who made principal payments in addition to scheduled payments in the past year on:						
Real estate loans	43.0	33.5	40.0	39.6	39.2	36.2
Nonreal estate loans	49.7	40.3	46.2	48.9	45.6	44.2
Interest rate paid on:						
Real estate debt (%)	8.7	8.9	9.0	9.9	8.9	8.7
Nonreal estate debt (%)	9.5	9.9	10.4	11.4	9.9	9.1
Percentage of respondents delinquent on principal and/or interest payments for:						
Real estate loans	1.2	3.6	4.4	3.4	2.9	1.1
Nonreal estate loans	11.7	9.1	10.8	8.7	10.6	7.7
Percentage of respondents turned down when applying for a loan	9.3	10.6	19.1	7.1	11.8	9.6

the change in owner equity for an individual operation. The statewide average debt-asset ratio of 22.7% as of January 1, 1992 (Table 3) was 1.5 percentage points higher than in 1991. The ratio was highest in northern Indiana (23.9%) and lowest in southern Indiana (19.9%). The average debt-asset ratio for full-time farmers was considerably higher at 29.2%.

Guidelines that use debt-asset ratios to describe the amount of financial stress facing farmers, are as follows:

Debt-asset ratio	Status of farmer
Under 40%	No immediate danger of insolvency
40% - 70%	Serious financial problems could lead to insolvency
70% - 100%	Serious financial problems will likely lead to insolvency
Over 100%	Technically insolvent

About 24% of those responding to the Indiana survey had debt-asset ratios exceeding 40% in 1992. This equals the 24% found in 1991, which is much lower than the 32% in 1985. About 5.7% had debt-asset ratios exceeding 70% in 1992, down from 6.6% in 1991 and 13% in 1985. The guidelines discussed above suggest that up to 5.7% of all Indiana respondents who have serious financial problems could become insolvent; however, this tends to oversimplify the problem. For example, some skilled managers who carry a relatively small proportion of their debt in the form of land debt may be in satisfactory financial condition despite having a debt-asset ratio exceeding 40%. Additional analyses involving subsets of respondents and cross-tabulations will be reported later in the article to assess more fully the meaning of the debt-asset ratio figures.

About 34% of respondents reporting gross farm incomes of $100,000 or over had debt-asset ratios exceeding 40% in 1992, which is up from the 31% in 1991. About 9.0% had debt-asset ratios exceeding 70% in 1992, up from the 7.3% in 1991, but still below the 12.6% in 1989. The guidelines discussed previously suggest that about 9% of Indiana respondents with $100,000 gross farm income and over could face extreme financial difficulties.

Delinquency Rates. A second measure of financial condition is the rate of delinquency of loan payments. Those respondents having real estate loans (48.8% of all respondents) were asked if their principal and interest payments were current. For all respondents, 2.9% said "no" (Table 3). This is 0.5 percentage points lower than the 3.4% reported in 1991 and nearly 6 percentage points lower than the 8.8% reported in 1986. This figure underscores the lessening of problems with real estate debt. Also, about 50% of those who were delinquent on their real estate loans were current on the interest payments and delinquent only on principal payments. The same question was asked about nonreal estate loans. About 10.6% of the respondents having nonreal estate loans (41.3% of all respondents) indicated that their principal and interest payments were not current (Table 3), nearly two percentage points higher than in 1991. The 1991 rate is only 3 percentage points lower than the figure reported in 1989, 13.7%. Comparable figures for 1985 and 1986 were 22% and 14%, respectively. About 77% of those who were delinquent on their nonreal estate loans were current on the interest payments and delinquent only on principal payments.

The delinquency rates for respondents with gross farm incomes $100,000 and over were lower than the delinquency rates for all respondents. The delinquency rate for real estate loans was only 1.1%, which is one-half of the 2.2% reported in 1991. But, the delinquency rate for nonreal estate loans increased from 5.3% in 1991 to 7.7% in 1992.

Loan Requests Rejected. A third indicator of the financial condition of farmers is the percentage of loan applications turned down by the lender. Respondents were asked if they were turned down for a 1991 farm loan and, if so, why the loan request was rejected. Only results for respondents who actually applied for a loan were considered. Of the 299 respondents indicating they applied for a loan (23% of all respondents), about 11.8% indicated they were turned down, which is up from 7.1% in 1991 (Table 3), but below the more than 16% reported in 1986.

Respondents were asked to indicate the reasons their loan applications were rejected. Their responses ranked by frequency appear in the following schedule:

Reason loan request was rejected	Percentage of total reasons
Insufficient equity	26%
Previous loan repayment problems	24
Low farm income	22
Lender not interested in making agricultural loans	13
Other	15
Total	100%

The percentage of respondents who indicated they were turned down because the lender is not interested in making agricultural loans, 13%, is 4 percentage points higher than the percentage found in 1991, 9%.

Respondents whose loan requests were rejected were asked if they eventually obtained loan funds for the 1992 crop year. Sixty-eight percent of these respondents said "yes." Thus, about 3.0% of those who applied for loans for the 1992 crop year were unable to get loan funds, which is higher than the 2.5% in 1991. However, it should be noted this is less than 1% of all respondents (1290). The sources of loan funds for the 68% who eventually received loans are ranked by frequency:

Source of loan funds	Percentage of total sources
Lenders other than FmHA	31%
FmHA	24
Relatives	17
Farm suppliers	10
Machinery dealers	7
All other sources	10
Total	99%

The 24% of the respondents who received loans from FmHA is higher than the 16% reported in 1991 and the 20% reported in 1988. This finding probably reflects the impact of the 1991 drought and the need for an increased number of borrowers to seek funds from FmHA.

Forty-six percent of respondents with GFI $100,000 and over applied for a 1992 farm loan. Of that number, 9.6% were turned down, up from 4.1% in 1991. Only one of those turned down indicated he/she was turned down because the lender was not interested in making farm loans, and only one person turned down for a loan was unable to get loan funds.

During the past 12 months, Indiana farmers have expressed concerns to the authors about the availability of loan funds. The concerns are that some lenders in Indiana have stopped making loans to farmers and this has resulted in a shortage of loan funds for farmers.

Consequently, further analysis was conducted on the six individuals who indicated they were turned down because the "lender is not interested in making agricultural loans." Five of the six had gross farm incomes less than $100,000 (two were less than $40,000). Only five of the six provided data for the analyses that follow. Four of the five had a net loss in 1991. The average debt-to-asset ratio for the five was 58.1%, one respondent had a debt-to asset ratio less than 40%, three had ratios between 40.0% and 69.9%, and one was insolvent. Four had real estate loans and all were current with their payments. Four had nonreal estate loans, but only two were current with their payments. Four of the five did acquire loan funds from another lender. Two of those four respondents acquired loan funds from input suppliers.

Thus, the majority of the respondents who indicated they were turned down for a loan because, "the lender is not making agricultural loans," were part-time farmers who had a net loss in 1991, and, for the most part, had a debt-to-asset ratio greater than 40.0%. So no evidence was found in this study to support the position there is a shortage of loan funds for full-time, creditworthy farmers.

Additional Information on the Incidence of Farm Financial Stress

In this section statistics are presented which show debt-asset ratios for all farms and those with gross incomes of $100,000 and over. Other statistics relate debt-asset ratios to debt owed by farm operators with different levels of gross income.

Debt-Asset Ratios by Size of Farms. Table 4 shows the percentage of all farmers and the percentage of farmers with gross incomes of $100,000 and over per year by debt-asset ratio in 1992. About one-fourth of all respondents had debt-asset ratios of 40% or more compared to about 34% of those with gross incomes of $100,000 and over. The percentage of respondents in this higher debt category decreased about one-half percentage point for all farmers, but increased about 3.5 percentage points for those with higher gross incomes (Table 4).

Amount of Debt Owed by Respondents in Different Debt-Asset and Gross Farm Income Categories. Debt is becoming less concentrated in the hands of respondents in the higher debt-asset ratio categories. As noted in the figures for 1992, about 15% of the debt was owed by respondents with debt-asset ratios of 70% or higher and about 4% of the debt was owed by respondents who were technically insolvent. The 4% is up from 3% in 1991, but down from 9.9% reported in 1988. The respondents who are technically insolvent and some respondents in the 70.0% to 99.9% debt-asset ratio category presumably are vulnerable to any future financial adversities encountered.

Debt-asset ratio category	Percentage of respondents	Percentage of debt
Under 40.0%	76.5%	45.1%
40.0% - 69.9%	17.8	40.0
70.0% - 99.9%	3.4	10.7
100.0% and over	2.3	4.3
Total	100.0%	100.1%

Farm Adjustments

Farmers were asked to review a list of 22 possible adjustments and to identify the adjustments they had made during the past 12 months and those they expected to make during the next 12 months. Respondents could also add adjustments to the list. The adjustments checked by respondents, ranked according to frequency of mention using the state figures for all respondents, appear in

Table 4. Distribution of farms according to debt-asset ratio for all farmers in surveys and farmers in surveys with gross farm incomes $100,000 and over per year.

Year and debt-asset ratio category	Percentage of respondents in category based on figures for: All farms	Percentage of respondents in category based on figures for: Farms with gross incomes $100,000 and over
1991 debt-asset ratio:		
Under 40.0%	76.0%	69.4%
40.0% - 69.9%	17.4	23.3
70.0% - 99.9%	4.9	7.0
100.0% and over	1.7	0.3
Totals	100.0%	100.0%
1992 debt-asset ratio:		
Under 40%	76.5%	65.8%
40.0% - 69.9%	17.8	25.1
70.0% - 99.9%	3.4	7.0
100.0% and over	2.3	2.0
Totals	100.0%	99.9%

Table 5. Each adjustment made or expected to be made, which accounted for less than 5% of the total, was lumped together in the "other adjustments" item in Table 5. The adjustments checked by respondents with $100,000 GFI and over are also reported in Table 5.

Past 12 Months. The adjustments made during the previous 12 months that were most frequently mentioned by respondents were "reduced debt," "purchased new/additional machinery," "increased off-farm work," "kept more complete records," and five other adjustments (Table 5). Several of the adjustments made during the past 12 months can be categorized as changes which helped them to reduce costs (e.g., those relating to reducing debt, reducing living expenses, and hiring others to do custom work), to diversify and reduce risks (e.g., used my machinery to do custom work for others, adding or expanding livestock enterprises, increasing off-farm work and buying crop insurance), and to more accurately measure farm costs and returns (e.g., keeping more complete records).

Respondents with $100,000 GFI and over placed much more emphasis on certain adjustments than respondents in general. Those adjustments include "purchased new/additional machinery," "kept more complete records," and "bought crop insurance." In addition, one adjustment which accounted for 6.7% of the adjustments for full-time farmers but accounted for only 4.4% for all respondents was "operate more land." Respondents with $100,000 and over placed less emphasis on "increased off-farm work" and "hired others to do custom work with their machinery" than all respondents.

Next 12 Months. Many of the adjustments planned for the next 12 months by the respondents are similar to those made during the previous 12 months and to those reported on previous surveys.

"Reducing debt" topped the list followed by "keeping more complete records," "purchasing new/additional

Table 5. Adjustments made by respondents in farming operations to deal with the farm financial situation.

	Percentage of total adjustments accounted for by item				
	All Respondents				Respondents with GFI $100,000 & over
Adjustment item and period	North	Central	South	State	State
Past 12 months					
Reduced debt	14.9	11.7	12.1	13.0	12.5
Purchased additional machinery	10.4	11.4	11.3	11.0	13.5
Increased off-farm work	8.8	7.5	10.0	8.7	5.4
Kept more complete records	7.4	7.2	9.3	7.9	8.7
Hired others to do custom work with their machinery	8.4	7.5	7.4	7.8	5.4
Used my machinery to do custom work for others	7.1	6.2	7.8	7.0	6.7
Reduced living expenses	5.9	6.7	6.1	6.2	5.4
Bought crop insurance	6.5	8.4	3.3	6.1	7.0
Increased or added a livestock enterprise	4.7	5.3	6.2	5.4	4.3
Other adjustments[9]	25.9	28.1	26.5	26.9	31.1
Totals	100.0	100.0	100.0	100.0[10]	100.0[12]
Next 12 months					
Reduce debt	14.6	14.5	10.4	13.3	12.7
Keep more complete records	9.5	8.1	9.4	9.0	10.5
Purchase additional machinery	8.9	8.2	8.4	8.5	9.3
Increase off-farm work	8.0	8.0	8.4	8.1	5.9
Buy crop insurance	8.0	9.3	5.0	7.5	7.8
Hire others to do custom work with their machinery	6.8	7.2	8.4	7.4	5.1
Increase or add a livestock enterprise	6.0	7.2	8.8	7.2	5.4
Reduce living expenses	7.7	6.1	6.4	6.8	7.3
Use my machinery to do custom work	5.7	5.8	5.9	5.8	7.3
Other adjustments[9]	24.8	25.6	28.9	26.4	28.7
Totals	100.0	100.0	100.0	100.0[11]	100.0[13]

9 Adjustments, each of which accounted for less than 5% of the state total.

10 In 1992 usable responses were 718.

11 In 1992 usable responses were 686.

12 In 1992 usable responses were 193.

13 In 1992 usable responses were 163.

machinery," "increasing off-farm work," "buying crop insurance," and "hiring others to do custom work with their machinery." Several of the adjustments planned for the next 12 months can be categorized as changes which will help them reduce costs (e.g., reducing debt, hiring others to do custom work with their machinery and reducing living expenses), more accurately measure farm costs and returns (e.g., keeping more complete records), diversify and reduce risks (e.g., increasing off-farm work, increasing or adding a livestock enterprise, buying crop insurance and using my machinery to do custom work for others) and upgrade capital (e.g., purchasing new/additional machinery).

As was the case for the past 12 months, respondents with $100,000 GFI and over placed much less importance on "increasing off-farm work" and "hiring others to do custom work with their machinery" than all respondents. Again, "operating more land" was planned as an adjustment by more full-time farmers (6.6%) than all respondents.

Summary and Implications

Key findings and implications of the 1992 farm finance survey are that:

- A higher percentage of respondents to the 1991 survey had losses than in 1990. About 15.5% of the respondents in 1991 had net farm incomes greater than $20,000, down from the 22% reported for 1990. The percentage of respondents in 1991 with a net loss, 31.1%, is much higher than the 23.8% in 1990. The percentage of full-time farmers reporting a net loss in 1991 is 14.6%.

- The economic condition of farmers will be influenced strongly by conditions in the nonfarm sector, because many part-time farmers in this group depend heavily on off-farm work for income. About 51% of all operators reported off-farm earnings. The average total gross nonfarm income for operators reporting off-farm income in 1991 was about $29,800.

- The average debt-asset ratio for respondents in 1992 is higher than the average ratio for respondents in 1991. The debt-asset ratio in 1992 is 22.7%, up from the 21.2% reported in 1991. The debt-asset ratio in 1992 for respondents with GFI of $100,000 and over is 29.2%.

- The delinquency rate on farm real estate debt in 1992, 2.9%, is down from the 3.4% reported in 1991. The 10.6% delinquency rate on farm nonreal estate debt in 1992 is up from 8.7% reported in 1991. However, it is below the 13.9% in 1986 (the highest percentage during the "Farm Crisis") and the 13.7% in 1989 (year following the 1988 drought). The delinquency rates on farm real estate and nonreal estate debt in 1991 for respondents with GFI of $100,000 and over is 1.1% and 7.1%, respectively.

- The percentage of Hoosier farmers who applied for a new loan or additions to existing farm loans for the 1992 crop year and were turned down, 11.8%, is up from 7.1% reported in 1991, but below the 16.3% in 1986. The percentage of full-time farmers who applied for a loan in 1992 and were turned down is 9.6%, up from 4.1% in 1991.

- The percentage of applicants in 1992 who applied for a loan but were turned down because the lender is not interested in making agricultural loans, 13%, is up from 9% in 1991. The percentage of respondents unable to get a loan for the 1992 crop, 3.0% of those who applied, is up slightly from the percentage in 1991.

- The percentage of all respondents in 1992 with debt-asset ratios less than 40%, 76.5%, is slightly higher than the percentage for 1991. The percentage of farmers in 1992 with gross farm incomes $100,000 and over and debt-asset ratios less than 40%, 66%, is lower than the 69% for 1991.

- The percentage of all respondents in 1992 with debt-asset ratios greater than 70%, 5.7%, is lower than the 6.6% reported in 1991. The percentage of farmers in 1992 with gross farm incomes $100,000 and over and with debt-asset ratios greater than 70%, 9.0%, is up from 7.3% in 1991.

- The percentage of debt held by all respondents in 1992 with 100% or higher debt-asset ratios, 4.3%, is up from 3.2% reported in 1991; but below the 9.9% in 1988, the highest percentage reported since the survey started in 1985.

- During the past year, "reducing debt" was the most frequently mentioned adjustment for respondents, followed by "purchasing additional machinery." "Reducing debt" was the most frequently mentioned adjustment for the upcoming year, followed by "keeping more complete records."

In summary, the 1992 Indiana Farm Finance Survey signals general deterioration in the financial condition of Hoosier farmers. Lower yields associated with the 1991 drought and lower prices are the primary causes of this deterioration. As a result of these worsened financial conditions, farmers in the higher debt-asset ratio categories could experience major financial problems in the future if they encounter any substantial adversity, such as low earnings from reduced yields and prices in 1992. Also, a group of Hoosier farmers continue to experience financial problems and will likely require additional debt restructuring and/or write-off.

Data from the 1992 survey indicate financial stress levels are not as severe as during the "Farm Crisis" in 1985-86 or even following the 1988 drought. The primary reason for this finding is the continuing effort of Hoosier farmers to reduce costs, improve efficiency, and reduce risks. The results of those efforts are reflected in the financial strength of Hoosier farmers following the 1991 drought.

Employment in Rural Indiana Counties

Ziyou Yu, Graduate Student and Deb Brown, Professor

Did employment in rural Indiana counties grow more slowly in the 1980s than in the 1970s? Was rural Indiana employment less stable in the 1980s than in the 1970s? Can we learn anything from a comparison of the 1970s and 1980s that will help us predict how Indiana's rural counties will fare in the 1990s?

Employment Growth: Down But Not Statistically Significant

We analyzed quarterly employment data for Indiana's 39 rural counties. A county is defined as rural if the largest town in the county in 1980 had less than 10,000 people. Table 1 shows Indiana's rural counties, with their annual employment growth rate in the 1970s and in the 1980s.

The mean annual growth rate in the 1970s was 4.6%, ranging from .3% to 16.0% per year. The mean annual employment growth rate in the 1980s was 3.7%, ranging from -.9% to 9.7%. Although the average employment growth rate was smaller in the 1980s for these rural Indiana counties, the difference was not statistically significant; that is, the difference between the groups was too small, given the variation among the counties, to conclude that these counties as a group grew less in the 1980s than in the 1970s.

Employment Stability: Down and Statistically Significant

While employment growth is extremely important, employment stability also strongly affects a county's economic health. For the same rate of employment growth, you would prefer a steady growth in employment to a pattern of wild swings up and down in the number employed. We, therefore, also calculated a measure of employment stability which compares employment swings in an industry or county to employment swings in Indiana as a whole. (This measure is described in more detail in *Stability and Growth of Economic Sectors in Indiana Counties, 1970-1980*, Purdue Agricultural Experiment Station Bulletin No. 420.) A smaller number means more stable employment. A negative number indicates a county whose employment moved countercyclically.

Table 1 shows stability measures for Indiana's rural counties in the 1970s and the 1980s. The mean employment stability measure for rural Indiana counties was 1.15 in the 1970s, with a range of .98 to 4.19. A 1.00 indicates a stability

Table 1. Annual Employment Growth Rates and Stability Measures for Indiana's Rural Counties in the 1970s and the 1980s.[1]

County	Annual 1970s Growth Rate (%)	Annual 1980s Growth Rate (%)	1970s Stability	1980s Stability
Benton	2.5	1.5	0.27	2.36
Blackford	1.4	1.5	1.10	1.06
Brown	16.0	7.2	4.19	7.12
Carroll	5.6	1.2	1.07	1.48
Crawford	6.2	4.5	2.44	4.83
Decatur	4.5	4.0	0.35	0.39
Dubois	5.3	3.6	0.58	0.85
Fountain	1.4	- 0.8	0.36	1.19
Franklin	4.3	2.9	1.53	3.70
Fulton	3.8	0.8	0.72	1.09
Greene	7.4	3.3	1.29	1.27
Harrison	5.5	3.8	0.96	1.85
Jasper	6.0	2.5	0.92	1.46
Jay	2.9	- 0.8	0.49	1.50
Jennings	4.0	7.7	0.91	- 1.51
LaGrange	1.6	6.3	- 0.98	1.54
Martin	1.3	3.8	0.92	1.65
Newton	3.8	2.5	1.92	3.95
Noble	2.0	4.9	1.94	1.20
Ohio	4.8	2.0	2.78	2.14
Orange	5.4	4.7	1.83	1.81
Owen	4.8	9.7	1.01	2.26
Parke	3.9	2.6	1.26	4.77
Perry	4.0	- 0.9	0.74	1.74
Pike	8.0	- 0.3	1.84	0.75
Pulaski	4.4	4.3	1.01	1.45
Putnam	3.4	3.9	1.00	0.48
Randolph	0.3	1.5	- 0.03	- 0.91
Ripley	3.9	3.8	0.34	1.12
Rush	2.2	2.7	0.41	1.00
Scott	1.5	6.1	1.92	0.98
Spencer	9.9	5.0	1.36	2.51
Starke	5.1	2.6	1.81	2.14
Steuben	5.3	7.9	1.42	0.18
Switzerland	3.4	1.5	0.32	1.09
Union	2.4	3.1	0.34	3.54
Warren	4.0	- 0.7	0.66	4.42
Washington	1.8	5.7	0.98	0.53
Whitley	2.6	6.8	0.69	- 1.36

1 *Industries with standard industrial classification codes above 80 were not included because of data problems. This excludes legal and educational services from this analysis.*

equal to the mean stability of all Indiana counties, rural and urban; so a mean stability of 1.15 indicates that employment in Indiana's rural counties was nearly as stable as in Indiana's urban counties during the 1970s. During the 1980s, however, the mean stability measure for Indiana's rural counties was 1.74, and the range was from -1.51 to 7.12. This suggests that Indiana rural counties were less stable compared with Indiana's urban counties in the 1980s than they had been in the 1970s (and this was a statistically significant difference).

Combinations of Employment Growth and Stability

A county might be willing to accept less employment stability in exchange for faster employment growth. Five counties had faster employment growth in the 1980s than they had in the 1970s, but less employment stability: LaGrange, Rush, Union, Owen, and Martin counties.

Most of the counties with less employment stability in the 1980s, however, also had lower employment growth rates than they had had in the 1970s.

Some counties seemed to have the best of all possible worlds in the 1980s, with higher employment growth and greater employment stability, too. The lucky eight were Steuben, Noble, Whitley, Randolph, Putnam, Jennings, Washington, and Scott counties.

Which Rural Industries Did Well?

It is useful to have hard evidence of increasing problems in Indiana's rural counties, but it would be more helpful to have evidence of where the problems lie. We can do that, to some extent, by looking at individual industries. We can determine which industries have had declining employment growth rates or decreasing employment stability in rural Indiana counties. We can then see how important the industries are in terms of the number of jobs they provide.

We examined 34 two-digit Standard Industrial Classification (SIC) industries. (Unfortunately, we did not have data so that we could examine all industries. In particular, we had inadequate data for Agriculture, Coal Mining, and Educational Services.) Some industries, like Health Services (SIC 80) and Eating and Drinking Places (SIC 58) occur in almost every county; others, such as Paper Manufacturing (SIC 36) or Printing and Publishing (SIC 27), occur in only a few rural counties.

Table 2 shows the industries, their mean employment growth in the 39 rural Indiana counties in the 1970s and in the 1980s, and their mean employment stability measures in the 1970s and 1980s.

Twenty-one industries grew more slowly in these rural counties in the 1980s than they had in the 1970s. Industries with slower growth included: General and Special Contracting, Food and Fabricated Metal Manufacturing, Communication, Eating and Drinking Places, Banking, Hotels and Lodging Places, and Health Services. Even with slower growth than in the 1970s, some of these industries — such as Hotels and Lodging Places, and

Table 2. Employment Growth and Stability by Industry in Rural Indiana Counties.[2]

Industry (SIC Code)	1970s Employment Growth Rate (%)	1980s Employment Growth Rate (%)	1970s Stability Measure	1980s Stability Measure
Non-Metallic Minerals (14)	4.5	-1.2	1.1	4.9
General Contracting (15)	8.8	1.9	3.7	7.6
Heavy Construction (16)	3.7	9.2	4.5	10.9
Special Contractors (17)	12.0	5.0	3.3	6.3
Food Mfg. (20)	9.5	3.3	2.2	1.8
Clothing Mfg. (23)	- 0.1	2.3	0.6	0.3
Lumber & Wood Mfg. (24)	9.3	3.2	- 0.8	4.6
Furniture Mfg. (25) [2]	1.9	1.8	0.1	- 0.1
Paper Mfg. (26)	0.6	1.4	0.7	- 0.1
Printing & Publishing (27)	4.7	5.4	0.1	0.5
Rubber & Plastic Mfg. (30) [2]	1.6	10.1	1.2	- 1.2
Stone, Clay & Glass Mfg. (32)	1.2	- 3.2	1.1	3.7
Primary Metal Mfg. (33)	- 0.1	- 0.03	0.4	0.3
Fabricated Metal Mfg. (34)	4.3	1.8	1.0	1.1
Non-Elec. Machinery Mfg. (35)	3.4	1.7	0.3	- 0.1
Electrical Machinery Mfg. (36)	1.8	1.0	0.9	0.0
Transportation Equip. Mfg. (37) [2]	- 2.4	6.6	0.7	0.3
Miscellaneous Mfg. (39)	0.1	1.0	0.3	0.3
Trucking & Warehousing (42)	9.6	6.4	0.9	1.8
Communication (48)	1.8	- 0.1	- 0.2	0.1
Elec., Gas & Sanitary Serv. (49)	7.5	6.2	0.6	0.2
Whsle. Trade: Durables (50)	0.4	2.5	1.4	0.9
Whsle. Trade: Non-Durables (51)	2.2	0.1	0.4	2.2
Lumber & Building Stores (52)	0.1	2.1	1.5	2.3
General Merchandise Stores (53)	3.2	6.8	0.4	1.6
Food Stores (54) [2]	5.2	4.0	0.4	1.3
Auto Stores & Serv. Stations (55)	3.1	2.4	1.2	1.4
Eating & Drinking Places (58) [2]	8.4	4.1	2.4	3.6
Miscellaneous Retail (59)	5.4	2.8	1.3	1.8
Banking (60)	5.4	2.5	0.1	0.1
Hotels & Lodging Places (70)	9.1	3.2	2.3	6.3
Business Services (73)	3.1	11.6	4.8	1.4
Amuse. & Recreation Serv. (79)	21.4	16.2	10.0	24.1
Health Services (80) [2]	16.0	8.5	1.3	- 0.6

2 *Indicates an industry which employed 8,000 or more employees in Indiana's rural counties as of December 1989.*

Health Services — grew quite rapidly in the 1980s.

Thirteen industries grew more rapidly in these rural counties in the 1980s than they had in the 1970s. Industries with faster growth in the 1980s included: Heavy Construction, Clothing Manufacturers, Rubber and Plastic Manufacturers, Transport Equipment Manufacturing, and General Merchandise Stores.

Nineteen industries offered less stable employment (relative to changes in Indiana's total employment) in the 1980s than they had in the 1970s. These industries included: Heavy Construction, Special Contractors, Lumber and Wood Manufacturing, Trucking and Warehousing, Lumber and Building Stores, Eating and Drinking Places, Hotels and Lodging Places, and Amusement and Recreation Services.

Thirteen industries offered more stable employment (relative to changes in Indiana's total employment) in the 1980s than they had in the 1970s. These industries included: Clothing Manufacturing, Electrical Machinery Manufacturing, and Health Services.

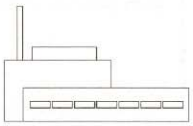
What Will Happen in the 1990s?

It is difficult to predict how different industries or different counties will do in the 1990s. It is particularly dangerous to predict the future simply by extrapolating current trends. However, we can look at the industries with the largest employment in rural counties. Simply by their size, their performance must strongly affect these counties. The largest sectors in these counties as of December 1989 were: Health Services (with roughly 16,000 employees in the 39 counties), Eating and Drinking Places (roughly 14,000 employees), Furniture Manufacturing (roughly 12,000 employees), Rubber and Plastic Manufacturing (roughly 10,000 employees), Food Stores (roughly 9,000 employees), and Transport Equipment Manufacturing (roughly 8,000 employees).

Growth in Health Services employment in these counties was slower in the 1980s than in the 1970s, but was still among the fastest growing sectors. It was a stable employment sector, too. If it continues to behave in the 1990s as it did in the 1980s, it will provide employment growth and stability for these counties.

Employment growth in Eating and Drinking Places in these 39 counties dropped by half between the 1970s and the 1980s, but was still moderately high. However, employment became considerably less stable in this sector. If employment instability continues to increase, this sector may help employment growth, but not employment stability in these counties in the 1990s.

Furniture Manufacturing has had a low but steady growth through the 1970s and the 1980s in these rural Indiana counties. If the pattern continues, this industry will not add much to the counties' employment growth, but will act to stabilize fluctuations in employment. It is important to notice that while all of these counties have significant employment in Health Services and Eating and Drinking Places, only 12 of the 39 have significant employment in the slow but steady Furniture Manufacturing.



Similarly, only 23 of the 39 counties had significant employment in the Rubber and Plastic Manufacturing sector. This industry had higher growth in these rural counties in the 1980s than in the 1970s. Rubber and Plastic Manufacturing employment became more stabilizing, even moving countercyclically during the ups and downs of the 1980s. If this industry were to continue these employment trends into the 1990s, it looks like another promising sector for Indiana rural counties.

Employment growth in Food Stores in rural Indiana counties also slowed in the 1980s, and employment stability decreased. Even in the 1980s, however, Food Stores had fair growth and good stability. If Food Store employment were to continue its trend, it will offer slow but fairly steady growth in the 1990s.

The last large sector in rural counties is Transport Equipment Manufacturing. While employment in this sector declined in the 1970s, it grew in these counties in the 1980s, and became increasingly stable as well. If this sector continues this trend, it too could be a major plus for these rural Indiana counties.

The U.S. Department of Commerce publishes *U.S. Industrial Outlook* each year. This publication contains five-year forecasts for U.S. industries and their subcomponents. For example, they forecast 4-6% growth in sales each year for Food Retailing through 1996. In the Amusement sector, they forecast 2% annual growth in movie box office receipts, 6% annual growth in prerecorded music sales, and 3-5% growth in VCR sales thru 1995. You might want to examine their predictions for any industry which is of particular interest to you. The forecasts, which are of sales rather than of employment, are not of course specific to rural Indiana counties.

Conclusions

The 1980s were not as kind to rural Indiana counties as the 1970s. Employment growth rates were lower in many counties, although variations between counties made it impossible to detect a statistically significant difference in average growth. Rural counties' employment stability had also declined compared with Indiana's non-rural counties. This relative deterioration in stability was statistically significant.

However, all is not doom and gloom. Although one must be cautious trying to forecast the future, rural Indiana counties appear poised to do better in the 1990s. Their largest industries (those with 8,000 or more employees in the 39 counties as a group) appear — based on their past performances — either to offer prospects of good rates of employment growth (such as Health Services, Rubber and Plastic Manufacturing, Transport Equipment Manufacturing, and perhaps Eating and Drinking Places) and/or of stabilizing ups and downs in employment swings (such as Health Services, Furniture Manufacturing, and possibly Food Stores).

Animal Agriculture: In Search of a Policy

Michael Boehlje, Professor

Much of the focus of commercial agricultural policy during recent years has been on crop production and protecting the income of crop and dairy farmers. Related issues such as the future of family farms, competitiveness of U.S. farmers in international markets, and environmental problems of agriculture have also focused primarily on crop production. Policy issues related to animal agriculture have typically been debated separately from those of "farm policy." Issues associated with animal agriculture are likely to rise to a much higher level on the policy agenda in the future. The purpose of this discussion is to identify some of those issues. Implications concerning the process of developing agricultural policy related to animals will also be presented.

Food Safety/Quality

Government policy plays a critical role in maintaining, assessing, and evaluating the quality and safety of animal agricultural products. Government grades and standards have as their purpose the difficult task of providing consumers with information on the quality characteristics of the meat and animal products they purchase and consume. They help provide order and structure to the markets. Labeling requirements are intended to further document the nutrient content of food products.

In addition to knowing the quality and nutrient content of what they eat, consumers are increasingly concerned about the safety of their food supply and the potential of ingesting carcinogens or other disease-bearing organisms. Federal and state regulatory authorities are being asked by the public to play an increasingly larger role in monitoring and regulating food safety. Since a significant portion of the food eaten by U.S. consumers is meat and animal products, this increased regulation will have a significant impact on animal agriculture.

Finally, safety regulations are important in international trade with the growing concern for using food safety and health regulations as alternatives to trade barriers, tariffs, and other trade restrictions. Recent examples include restrictions by the European Community on imports of meat products because of concerns about inadequate residue detection standards and procedures in U.S. packing and processing facilities. Thus, current discussion of harmonization of international safety and health policies, as well as environmental regulations, is crucial to trade negotiations as well as expanded trade in animal products (Kozloff and Runge, 1991).

Consumption and Quantity

A second animal agriculture policy issue is that of the quantity of animal protein and animal products consumed. The medical profession and numerous nutrition and health scientists have raised questions about the excessive fat content in U.S. consumers' diets, and the implications of this diet for heart disease and cancer. Related concerns have been raised about the cholesterol intake in the typical U.S. consumer's diet. The policy response has yielded dietary guidelines as well as increased research on the causal relations between diet and health. Although most segments of the livestock industry have taken a "pro science" viewpoint on such issues (i.e., let's do the medical and diet/health-related research to obtain the facts), some groups have been critical and defensive concerning dietary guidelines and the recommendation for moderation in animal protein consumption. Continued concern on the part of consumers about health and safety as related to diet (quantity as well as quality) suggests that they will demand increased monitoring and regulation by the public sector. It will be essential for industry leaders in agriculture to continue to participate in the dialogue concerning what are appropriate and safe quantity (daily intake) as well as quality standards for food products.

"Issues associated with animal agriculture are likely to rise to a much higher level on the policy agenda in the future."

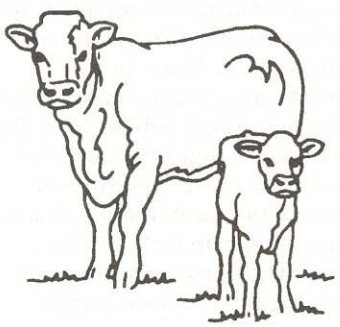
A second dimension of the quantity issue is the potential for expansion of exports of meat and animal protein products. U.S. live animal, meat and meat product, and dairy and egg exports have grown from $1.49 billion in 1979 to $3.73 billion in 1989, while imports have increased from $3.22 billion to $4.12 billion during this same period (FAO Trade Yearbook). Environmental constraints on livestock production, such as the current case in Taiwan, may improve U.S. export opportunities, particularly in the Pacific Rim. Policies concerning export promotion and enhancement programs, and trade regulations and disputes as evidenced by recent discussion with respect to exporting beef to Japan, meat products to the European Community, and importing pork from Canada suggest that trade policy will be a major consideration for animal agriculture in the future.

Concentration and Control

Concentration and control issues in animal agriculture are complex and multidimensional. First is the concern about fewer firms and increased concentration in the meat packing/processing industry and the implications of that increased concentration for market power and price exploitation. In reality, this is not a new issue; in fact, concern about monopoly power earlier this century resulted in the Consent

Decree in 1920, whereby meat packers agreed not to monopolize markets rather than be subject to prosecution under the Sherman Antitrust Act. This Consent Decree was in effect until 1981 (McCoy and Sarhan). Although the current concern with respect to market power is the high concentration in the beef packing industry, similar concerns have been raised about concentration in the pork and poultry industry. Experience in the poultry industry suggests that concentration and control initially results in lower prices and increased responsiveness to consumer needs. Larger producers and processors as well as consumers will likely benefit, but smaller firms in both the producing and processing sector will find it difficult to be competitive to survive. The critical question is, when does concentration become a deterrent to lower prices and greater economic efficiency?

A related issue is concentration in the production sector. With the development of the feedlots in the Southern Plains, the cattle feeding industry has become increasingly concentrated as well as integrated from producer to retail level. Producers in both the swine and dairy sector are raising questions about trends to larger-scale operations and integrated production in those industries. As the packing and processing industry becomes more specialized with larger plants, flow scheduling to maintain throughput at plant capacity becomes increasingly important for efficient operations. Consequently, there will be increased pressures in the animal industry to coordinate the production and processing activities to keep both feedlots and packing plants operating at peak efficiency. Questions concerning control of production, processing, and distribution; the future of the family farm and independent producers; contract production; etc. have been and will continue to be heavily debated by state legislatures and to a lesser degree at the federal level.



Treatment of Animals

Animal welfare is rapidly becoming a dominant concern in animal agriculture. Increased regulation of the living environment for animals has been a predominant theme in Europe in recent years, and more and more concerns are being expressed about the welfare of animals in the U.S. as well. It is not only an issue of the production practices used by farmers to increase efficiency, including confinement facilities, nutrition practices, and health care, etc.; it is also the handling of animals in the distribution/marketing chain, including treatment by truckers, stockyard and marketing agencies, and packing plants. Furthermore, the animal rights/animal welfare issue also involves such diverse dimensions as the use of animals in research by the medical profession and scientific community, the use of animals for sporting purposes by the horse and dog racing and hunting industries, and the care and treatment of pets and companion animals.

The relationship of humans to animals has been evolving for centuries, but only in recent history has it become a focal point of public policy. The manifold issue of animal rights and animal welfare has the potential to become one of the most significant and complicated issues on the animal agriculture policy agenda. Producers and the agricultural industry will have to recognize the legitimate concerns of animal welfarists if they expect to help shape this dimension of animal agricultural policy.

Location of Facilities

The issue of geographic concentration of animal production has been noted earlier. Questions are being raised about the potential shift of the swine industry from the traditional Midwest production region to the Southern States and Southeast, just as the cattle feeding industry moved from the Midwest to the Southern Plains during the 1970s. And, increasingly, some state legislatures are becoming aware that animal agriculture is a significant part of rural development policy and that production, processing, transportation, and distribution of animal products and the inputs required for animal production are an important source of employment opportunities and economic growth for rural areas.

Site location decisions, as well as adoption of appropriate technology to reduce the potential of air and water pollution, have become major considerations in livestock production. No longer can producers decide to locate livestock facilities nearby or include them as part of the farmstead for convenience or security reasons, as was commonly the case in the past. The site decision must include considerations of location relative to streams and waterways where runoff during heavy rainstorms or as a result of accidental spills could result in water pollution. It must consider soil characteristics if a lagoon or other waste storage facility is to be built, with preference for high clay content soils that can be packed to eliminate or reduce the potential of seepage or leaching of high concentrations of nitrates and other potential pollutants into underground water supplies. The siting decision must also consider the availability of adequate land for waste application. Also of concern is the issue of location relative to urban centers and/or neighbors who may be subject to odors or air pollution from the production facility or from the disposal of animal wastes. For some of the recent siting decisions for large-scale hog production facilities (for example, National Farm's decision to locate large hog facilities in Colorado and Texas), the availability of adequate acreage for land-based disposal of animal wastes contiguous to the production facility that can be purchased or leased was a major consideration. Feedlot siting

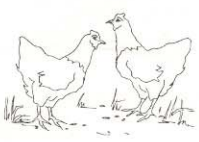
decisions will increasingly be impacted by state and local zoning and permit regulations.

Human Safety and Health

The producer safety and health dimensions of animal agriculture have received even less attention than issues of animal welfare in recent years. Yet, agriculture has been documented as a high-risk industry with serious safety problems. Confinement livestock production in particular has its share of well publicized fatalities from pit gases. But the more serious problem may be the chronic, long-term health problems of continually working in confinement facilities with a high concentration of ammonia and other gases. While not known at this time, this may be agriculture's parallel to black lung disease in the coal mining industry. Occupational Safety and Health Administration rules and regulations have not become a major force in confinement production of livestock, but could become increasingly important in the future with increased size and concentration of livestock facilities. Human safety and health in animal production is an important but quite likely underrated public policy issue.

Supply Management and Flow Scheduling

Except for the dairy industry, the livestock sector has not been subject to the same level of government intervention concerning supplies and supply management as has occurred in crop agriculture in the U.S. But various forms of supply management are commonplace in other countries. For example, Canada has used marketing boards and quota systems for supply management in the poultry, pork, and dairy sectors. The dairy sector in the U.S. has recently debated alternative inventory or supply control management options to more effectively balance supply and demand than has occurred with the current price support program.



Quotas and marketing boards have also been discussed with particular reference to the U.S. dairy industry.

A challenging policy issue is the role of "supply or marketing management" organizations such as marketing boards and government trading agencies as we move to an environment of increased international trade. Will such organizations in other countries be dismantled in favor of less government intervention or industry coordination in a more open world economy? Or will the U.S. determine that to obtain countervailing power it needs a more uniform industry or government-sponsored coordinator and promoter of exports for specific commodities, including livestock and livestock products?

As noted earlier, a second dimension of supply management is flow scheduling in the packing and processing industry. Although such mechanisms as contract production, vertical integration, and ownership of production facilities and animals may not have a significant impact on aggregate supplies, they do influence the price discovery mechanism, the ability of independent producers to have access to the market, and the efficiency of the production, processing, and distribution system. Again, the current debate in many Midwestern states concerning corporate farming, contract production, vertical integration, and the future of family farming raises important policy issues.

Research and Product Development

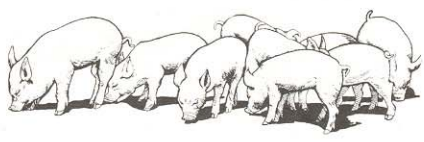
The role of both the public and the private sector in funding new technology in terms of animal production practices is critical to the future of animal agriculture. In addition to the traditional focus on nutrition, health, breeding and genetics, and other production practices, increased research emphasis will be required for the development of new meat and animal protein products to respond to consumers' more sophisticated dietary requirements. A fundamental challenge is whether production and product development research should be the focal point of public sector resources, or whether the private sector should take primary responsibility for developing new technology.

Traditionally in the agricultural production sector, public institutions such as the land grant universities and USDA have had the prime responsibility for developing new technology and have generally made it available to all potential users. New technology has been a public good. But increasingly, private sector firms are dominating research and development activities in agriculture (for example, in swine breeding, biotechnology, and genetic engineering, etc.) and their dominance, combined with patent protection laws, results in more and more agricultural technology becoming proprietary in nature. Competitiveness in production agriculture is highly dependent on access to new technology, and proprietary control of that technology may result in significant control of the entire production system and food chain. The implications of new technology and public versus private control of that technology for the structure of the industry, the coordination between sectors, and the competitiveness and efficiency of the sector must be debated.

A closely related issue is the use of biotechnology and genetic engineering techniques in meat and animal product production and processing activities. Certainly, the current debate concerning bST in milk production and pST in pork production has raised a challenging policy issue concerning the use of public sector funds to develop technology which has controversial social, economic, and ethical dimensions.

Conclusions

Animal agriculture as a whole will face increased governmental regulation and intervention. In contrast to



the past, agricultural policy will focus more heavily on the livestock sectors. A key question will be the role that the livestock industry will play in shaping that policy. Historically, livestock producers have not been major players in national public policy debates, but have instead prided themselves on their independence of government programs (except dairy). Increasingly, that will not be the case, and thus all participants, including livestock producers, should contribute to the development of agricultural policy.

A second observation is that animal agricultural policy will be shaped by many players, and through seemingly unlikely coalitions of those players. For example, animal rights issues impact the medical profession, the scientific community, hunters, and the game sports industries, and individuals who have companion pets. This is an unlikely group of individuals to develop a comprehensive policy concerning animal rights or animal welfare. So the participants who will shape the policy will represent a very broad set of constituency groups, making the negotiations very difficult for those who are naive about the policy making process.

And, finally, animal agricultural policy will not benefit from the focal point in crop agricultural policy of a relatively neat, clean, compact "Farm Bill." Animal agricultural policy (and increasingly crop agricultural policy as well) is sufficiently diffuse that it cannot be contained in a single piece of farm legislation. It is not the responsibility of a single federal agency. In fact, it is going to be set at international, federal, state, and local levels. Thus, there will be no focal point in terms of institutional structure or level of government agency as has been the case in crop agricultural policy.

Thus, animal agricultural policy involves an extremely complex agenda, a relatively naive set of participants from the agricultural sector, a very diverse set of players who will be setting that policy, and a diffuse set of government agencies, institutions, and authorities that will be implementing the resulting policies. The challenge is almost overwhelming.

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