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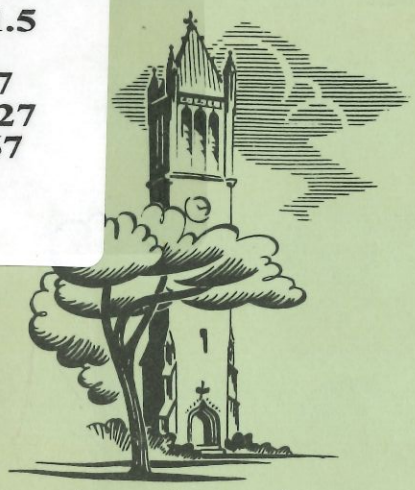

FARM BUSINESS RECORD AND ANALYSIS SYSTEMS OF IOWA FARM OPERATORS

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The study was conducted by the author in cooperation with the Department of Education and the Iowa Agricultural and Home Economics Experiment Station, and the Statistical Laboratory at the Iowa State University of Science and Technology.

The study was conducted under the direction of Professor C. E. Bundy.

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by

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Purpose of the Study

The objectives of this investigation were: (1) to determine the procedures and practices in farm business record keeping and analysis used by Iowa farm operators; (2) to determine the degree to which farm business records are kept by Iowa farm operators; (3) to determine the degree to which farm business records are used for analysis purposes by Iowa farm operators; and (4) to investigate the relationship between certain farm operator and farm business characteristics and the degree to which farm business records are kept and used for analysis purposes by Iowa farm operators.

The study was conducted in cooperation with the Department of Education and the Statistical Laboratory at the Iowa State University of Science and Technology, and the Iowa Agricultural and Home Economics Experiment Station. Financial assistance was provided under sponsorship of Agricultural Experiment Station Project 1622.

Method of Procedure

The population included Iowa farm operators, residing in the open country area of the state, whose farm operations had gross sales of agricultural products totalling $2,500 or more in 1965. In addition, an individual must have met the following criteria to have been classified as a farm operator: (1) must have received his remuneration from profits (or losses) of the farm business; (2) must have made decisions in the operation and management of the farm: and (3) in the case of shared management (partnerships), an individual must have worked at least 90 days on the farm during the calendar year of 1965.

A stratified multistage cluster sample was drawn, using Master Sample of Agriculture materials. The state was stratified into five types of farming areas; Stratum I, Western Livestock Area; Stratum II, Cash Grain Area; Stratum III, Southern Pasture Area; Stratum IV, Northeast Dairy Area; and Stratum V, Eastern Livestock Area. Initially, 22 counties were drawn with probability proportional to the estimated number of farms with gross sales of $2,500 or more in 1963. There were 115 secondary sampling units - area segments of land of such size so as to contain an expected number of three farms each. The resulting sample was self-weighting.

Data were collected by personal interview. The questionnaire provided for obtaining information regarding the type of records kept by farm operators on their overall farm businesses and on the enterprises of crops, beef cattle, swine and dairy.

In processing the data, gross farm income was used as a measure of farm size; this figure included government payments to the farm in 1965, and the value of the landlord's share of the produce in cases where the operator rented land on other than a cash basis. Farms were classified by type as (1) cash grain farms, (2) livestock farms, (3) dairy farms, and (4) general farms; the criteria for classification was based upon the percentage of gross income produced by the different enterprises within the farm operation. Size measures for the beef and swine enterprises were developed by use of a technique similar to the concept of animal units. In order to measure the degree to which a farm operator kept and utilized records in a certain area, record keeping and analysis (RK-A) index scores were developed for the overall farm business and the enterprises of crops, beef cattle, swine and dairy. A panel of three farm management specialists independently assigned weights, from zero to eight, to each record keeping item and analysis measure.

Field enumeration of the sample identified 345 farm operators meeting the criteria outlined earlier. From these, 327 interviews were completed; five questionnaires were discarded because of missing or incomplete information, and the results of the study were based upon data from 322 operators. The final response rate was 92.8 percent, with a refusal rate of only 3.7 percent.

Findings

Upon comparing the sizes of the sample farms in acres with results on the 1964 Census of Agriculture (32), the sample frequencies compared very favorably, with minor exceptions. The mean size of the sample farms was 230.3 acres, whereas the average acreages of Census farms was 219.0 acres. Larger farms were found in the Southern Pasture Area, and the mean acreage of farms in the Cash Grain Area was also larger than that of the overall group. Smaller farming operations were located in the Eastern Livestock Area and the Northeast Dairy Area.

It was found that 91.3 percent of the farm operators interviewed were married males. Five female operators were identified. The mean age of the respondents was 46.3 years as is revealed in Table 1. There were only ten operators (3.1 percent) who were younger than 25 years of age, and 26 percent were 55 years or older. When classified by ownership status, it was discovered that 36 percent of the operators were owners, 37.3 percent were renters, and 26.7 percent both owned and rented land. Operators owning all of their land were typically older individuals, with the younger farmers tending to rent either part or all of their land base.

When data in Table 2 regarding educational background of operators were tabulated, it was found that more than one-third of the respondents had completed less than nine years of school, and only 6.8 percent had completed 13 or more years. Younger operators characteristically received more formal education. Only 33.2 percent of the operators had received some type of formal education. Only 33.2 percent of the operators had received some type of formal education in agriculture. About 22 percent had been enrolled in high school vocational agriculture, whereas 12.1 percent had received

Table 1. Age of operators by ownership status

Years	Ownership status							
	Owner		Renter		Owner-renter		Total	
	No.	%	No.	%	No.	%	No.	%
Under 25	4	3.4	4	3.3	2	2.3	10	3.1
25 to 34	13	11.2	29	24.2	2	2.3	44	13.7
35 to 44	18	15.5	36	30.0	38	44.2	92	28.6
45 to 54	32	27.6	32	26.7	28	32.6	92	28.6
55 to 64	35	30.2	13	10.8	15	17.4	63	19.6
65 and over	14	12.1	6	5.0	1	1.2	21	6.4
Total	116	100.0	120	100.0	86	100.0	322	100.0
Mean age	50.8		42.6		45.6		46.3	

Table 2. Years of school completed by operators by age

Years	Age of operator									
	Under 35		35 to 44		45 to 54		55 & over		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Less than 8	0	0	0	0	4	4.3	9	10.8	13	4.0
8	6	11.1	23	25.0	39	42.4	42	50.0	110	34.2
9 to 11	6	11.1	12	13.1	10	10.9	16	19.0	44	13.7
12	34	63.0	50	54.3	33	35.9	16	19.0	133	41.3
13 to 15	7	13.0	6	6.5	4	4.3	1	1.2	18	5.6
16 and over	1	1.8	1	1.1	2	2.2	0	0	4	1.2
Total	54	100.0	92	100.0	92	100.0	84	100.0	322	100.0

veterans on-farm training. Only 2.5 percent of the farmers had college training in agriculture. About 15 percent of the operators had received some type of informal training in record keeping and analysis, such as adult farmer groups, short courses, extension record keeping groups, or farm business associations as is revealed in Table 3. Six farmers were members of the Dairy Herd Improvement Association, and three had participated in extension record groups.

Table 3. Informal instruction in farm management, record keeping and analysis received by operators

Type of instruction	Number	Percent[a]
Adult farmer groups	19	5.9
Short courses	16	5.0
Iowa Farm Business Association	12	3.7
Extension record keeping groups	9	2.8
Dairy Herd Improvement Association	7	2.2
No informal instruction	274	85.1
Number of operators reporting	322	

[a]Does not total 100 since some operators received instruction from more than one source.

In Table 4, it was observed that over one-half of the operators had used a record book prepared especially for farm accounting in 1965. About 22 percent of the farmers had used a general ledger. Another 9.6 percent of the respondents had purchased and prepared a simple notebook in which to record the activities of the farm firm. It was significant to note that almost 15 percent did not use a record book in 1965. It was found that respondents who had used either a farm record book or a general ledger had attained a higher educational level. The type of record book used was not significantly related to whether or not they had received formal education in agriculture.

The wives of over 60 percent of the married male operators had some part in making record book entries in 1965. About 30 percent of the farmers had given their wives entire responsibility for making entries, and only 41.1 percent of the respondents made all entries themselves. The sample data indicated some association between the persons making the record entries and the characteristics of educational level of the operator and farm size as measured by gross farm income; however, neither of the relationships was statistically significant. Results also indicated that almost 96

Table 4. Membership of operators in farm record keeping groups

Type of group	Membership					
	Member in 1965		Member previous to 1965 but not in 1965		Total	
	No.	%	No.	%	No.	%[a]
Iowa Farm Business Association	6	1.9	6	1.9	12	3.7
Extension record group	3	0.9	6	1.9	9	2.8
Dairy Herd Improvement Association	4	1.2	-[b]		4	1.2
None	309	96.0	310	96.2	301	93.5
Total	322	100.0	322	100.0	-	-

[a]Does no total to 100 since some operators had been members of more than one type of group.

[b]Data not collected.

percent of the operators had engaged either a firm or an individual to prepare their 1965 income tax returns. Over one-half of the respondents had hired a lawyer to accomplish this task, and about one-fourth of the individuals' returns had been prepared by an income tax service.

When the proportions of operators who kept individual record items and analysis measures were investigated in Table 5, it was generally found that few farmers kept detailed records and made intensive analysis of their farm businesses. Items and measures pertaining to the overall farm business completed by higher percentages of sample operators were: (1) a record of cash income, 99.1 percent; (2) a record of cash expenses, 99.1 percent; (3) kept a depreciation schedule, 97.2 percent; and (4) computed the net profit of the overall farm business, 87.9 percent. Items and measures computed by lesser proportions of respondents were: (1) returns per $100 of feed fed to livestock, 9.2 percent; (2) a record of operator and family labor used, 9.3 percent; (3) returns above the value of feed fed to livestock, 25.9 percent; and (4) a record of family living expenses, 30.1 percent. A net worth statement was prepared in 1965 by only 48.8 percent of the operators interviewed.

Record items and analysis measures for crops enterprises used by the farmers studied in Table 6 were: (1) a record of the amounts of fertilizer applied per acre for each crop, 84.3 percent; (2) a record of crop yields per acre, 81.0 percent; and (3) a history of crops grown on fields each year, 79.5 percent. Smaller proportions of operators keeping the item or

Table 5. Record items and analysis measures for the overall farm business by number and percent of operators keeping the item or computing the measure in 1965, and 95% confidence limits for the population percentage

Record item or analysis measure	Total number of operators[a]	Operators keeping item or computing measure		95% confidence limits for population percent	
		No.	%	Lower	Upper
Physical inventory at the beginning of the year	322	197	61.2	55.8	66.6
Valuation of the inventory	322	145	45.0	39.5	50.5
Depreciation schedule	320	311	97.2	-	-
Net worth statement	322	157	48.8	43.3	54.3
Cash income	322	319	99.1	-	-
Cash expense	322	319	99.1	-	-
Operator and family labor used	322	30	9.3	-	-
Family living expenses	322	97	30.1	25.0	35.2
Farm products used at home	270	134	49.6	43.5	55.7
Loss-death record	315	191	60.6	55.1	66.1
Returns above value of feed fed to livestock	305	79	25.9	20.9	30.9
Returns per $100 of feed fed to livestock	305	28	9.2	-	-
Net profit (or loss) or overall farm business	322	282	87.9	84.3	91.5
Used records to compute profit (or loss) made by individual enterprises	322	200	62.1	56.7	67.5
Used records to adjust size and scope of enterprise	322	127	39.4	34.0	44.8
Used records to help in improving farming practices	322	197	61.2	55.8	66.6

[a] Includes only those operators for which the item or measure is applicable.

Table 6. Record items and analysis measures for the crops enterprise by number and percent of operators keeping the item or computing the measures in 1965, and 95% confidence limits for the population percentage

Record item or analysis measure	Total number of operators[a]	Operators keeping items or computing measure		95% confidence limits for population percent	
		No.	%	Lower	Upper
Crop yields per acre	310	251	81.0	76.5	85.5
History of crops grown on fields each year	308	245	79.5	74.9	84.1
Yields of crops grown on each field each year	308	133	43.2	37.6	48.8
Amounts of fertilizer applied per acre for each crop	281	237	84.3	80.0	88.6
Amounts and kinds of fertilizer applied on each field each year	298	220	73.8	68.7	78.9
Comparison of crop yields with those of neighbors	310	223	71.9	66.8	77.0
Comparison of crop yields with average yields in county	310	147	47.4	41.7	53.1
Comparison of crop yields with average yields in state	310	114	36.8	31.3	42.3
Yield comparisons between different varieties, fields, etc.	310	56	18.1	13.7	22.5
Total expenses per crop	310	52	16.8	12.6	21.0
Labor costs per crop acre	310	13	4.2	-	-
Machinery costs per crop acre	310	30	9.7	-	-
Value of crops harvested	310	189	61.0	55.5	66.5
Value of crops harvested per crop acre	310	83	26.8	21.8	31.8
Net profit (or loss) for each crop	310	69	22.3	17.6	27.0
Net profit (or loss) per acre for each crop	310	40	12.9	9.1	16.7

[a]Includes only those operators for which the item or measure is applicable; 12 operators had no cultivated crops in 1965.

computing the measure were found for the following: (1) labor expenses per crop acre, 4.2 percent; (2) machinery costs per crop acre, 9.7 percent; and (3) net profit per acre for each crop grown, 12.9 percent.

The 212 operators who had beef cattle enterprises were queried as to the record items and analysis measures which they completed in 1965 and their responses are summarized in Table 7. Items and measures with higher percentages were: (1) weights of fat cattle sold, 98.4 percent; (2) number of calves kept and fed out on the farm, 96.2 percent; (3) weights of feeder cattle purchased, 93.8 percent; and (4) percentage calf crop, 83.3 percent. Items and measures possessing lower percentages were as follows: (1) labor costs per 100 pounds of beef produced, 1.4 percent; (2) total costs per calf weaned, 5.6 percent; and (3) returns per $100 of feed fed to beef cattle, 6.6 percent. Only about one-half of the operators computed the net profit earned by their beef cattle enterprises.

It was found that 76.7 percent of the farmers had swine enterprises in 1965. In Table 8, record items and analysis measures computed by higher proportions of these operators were: (1) number of pigs kept and fed out on the farm, 97.0 percent; (2) weights of pigs sold for slaughter, 95.2 percent; and (3) dates of farrowing, 84.7 percent. Items and measures with lower percentages were as follows: (1) labor costs per sow, 0.9 percent; (2) labor costs per 100 pounds of gain, 1.3 percent; (3) the weight of the litter at farrowing, 4.2 percent; and (4) total costs per pig weaned, 6.5 percent. Of the operators who fed out pigs for slaughter, only 11.2 percent calculated the daily rate of gain achieved by their feeding programs.

There were 76 operators who had a dairy herd of five or more cows in 1965. In Table 9, record items and analysis measures pertaining to the dairy enterprise computed by higher percentages of these operators were as follows: (1) breeding records, 84.2 percent; (2) calving records, 77.6 percent; and (3) amount of supplement fed, 66.2 percent. The net profit earned by the dairy herd was computed by 56.6 percent of the respondents. Items and measures completed by lesser proportions of operators were: (1) labor costs per cow, 6.6 percent; (2) labor costs per 100 pounds of milk produced, 9.2 percent: (3) pounds of butterfat produced per cow, 14.1 percent; and (4) feed costs per 100 pounds of milk produced, 15.8 percent.

About 55 percent of the operators felt that they should have kept better records on their farm business in 1965. Of these, 43.8 percent indicated that their records should have been more complete and accurate, whereas about 30 percent felt they should have kept more detailed enterprise records. The primary reason given for not keeping better records was lack of time. Lack of knowledge of record keeping methods and analysis procedures was indicated as a handicap by 10.2 percent of the operators.

Hypotheses were tested regarding relationships between operator and farm characteristics and the degree to which operators kept and used farm records in the area of the overall farm business and the enterprises of crops, beef cattle, swine and dairy, as measured by RK-A index scores. Multiple regression analysis with dummy independent variables was used.

From the results of the regression analyses, it was inferred that the

Table 7. Record items and analysis measures for the beef cattle enterprise by number and percent of operators keeping the item or computing the measure in 1965, and 95% confidence limits for the population percentage

Record item or analysis measure	Total number of operators[a]	Operators keeping item or computing measure		95% confidence limits for population percent	
		No.	%	Lower	Upper
Breeding records (dates)	132	73	55.3	46.6	64.0
Calving records (dates)	132	74	56.1	47.5	64.7
Weaning weights of calves	132	21	15.9	9.5	22.3
Number of calves kept and fed out on farm	53	51	96.2	-	-
Weights of feeder cattle purchased	97	91	93.8	-	-
Weights of fat cattle sold	125	123	98.4	-	-
Amount of grain fed	195	54	27.7	21.3	34.1
Amount of supplement fed	186	126	67.7	60.8	74.6
Amount of hay and roughage fed	211	56	26.5	20.3	32.7
Pasture and grazing costs	182	37	20.3	14.3	26.3
Separate feed record for cow herd and cattle fattened for slaughter	44	12	27.3	13.9	40.7
Percentage calf crop	132	110	83.3	76.8	89.8
Average weaning weight of calves	132	18	13.6	7.6	19.6
Total costs per calf weaned	125	7	5.6	-	-
Average daily rate of gain	125	53	42.4	33.6	51.2
Amount of feed fed per 100 pounds gain	125	11	8.8	-	-
Feed costs per 100 pounds of beef produced	211	16	7.6	-	-
Labor costs per 100 pounds of beef produced	211	3	1.4	-	-
Returns above value of feed fed	212	38	17.9	12.6	23.2
Returns per $100 of feed fed	212	14	6.6	-	-
Net profit (or loss) from beef cattle	212	113	53.3	46.4	60.2

[a]Includes only those operators for which the item or measure is applicable.

Table 8. Record items and analysis measures for the swine enterprise by number and percent of operators keeping the item or computing the measure in 1965, and 95% confidence limits for the population percentage

Record item or analysis measure	Total number of operators[a]	Operators keeping item or computing measure		95% confidence limits for population percent	
		No.	%	Lower	Upper
Breeding records (dates)	215	174	80.9	75.5	86.3
Dates of farrowing	216	183	84.7	79.8	89.6
Size of litter	216	145	67.1	60.7	73.5
Weight of litter	216	9	4.2	-	-
Weaning weight of pigs	216	34	15.7	10.7	20.7
Number of pigs kept and fed out on farm	201	195	97.0	-	-
Ear-notch pigs	216	63	29.2	23.0	35.4
Weights of feeder pigs purchased	33	24	72.7	57.2	88.2
Amount of grain fed	246	86	35.0	28.9	41.1
Weights of pigs sold for slaughter	231	220	95.2	-	-
Amount of supplement fed	244	185	75.8	70.3	81.3
Pasture costs	208	22	10.6	6.3	14.9
Separate feed record for sow herd and pigs fattened for slaughter	201	32	15.9	10.7	21.1
Average number of pigs farrowed per litter	216	138	63.9	57.4	70.4
Average number of pigs weaned per litter	216	147	68.1	61.8	74.4
Average weaning weight of pigs	216	27	12.5	8.0	17.0
Labor costs per sow	216	2	0.9	-	-
Total costs per pig weaned	216	14	6.5	-	-
Average daily rate of gain	233	26	11.2	7.1	15.3
Amount of feed fed per 100 pounds of gain	233	19	8.2	-	-
Feed costs per 100 pounds of gain	233	26	11.2	7.1	15.3
Labor costs per 100 pounds of gain	233	3	1.3	-	-
Returns above value of feed fed	247	55	22.3	17.0	27.6
Returns per $100 of feed fed	247	27	10.9	6.9	14.9
Net profit (or loss) from swine enterprise	247	139	56.3	50.0	62.6

[a]Includes only those operators for which the item or measure is applicable.

Table 9. Record items and analysis measures for the dairy enterprise by number and percent of operators keeping the item or computing the measure in 1965, and 95% confidence limits for the population percentage

Record item or analysis measure	Total number of operators[a]	Operators keeping item or computing measure		95% confidence limits for population percent	
		No.	%	Lower	Upper
Number of cows milked each month	76	36	47.4	35.9	58.9
Number of dry cows in herd each month	76	34	44.7	33.3	56.1
Breeding records (dates)	76	64	84.2	75.8	92.6
Calving records (dates)	76	59	77.6	68.0	87.2
Amount of grain fed	76	27	35.5	24.5	46.5
Amount of supplement fed	74	49	66.2	55.2	77.2
Amount of hay and roughage fed	76	24	31.6	20.9	42.3
Pasture and grazing costs	72	13	18.1	9.0	27.2
Average prices received from milk and/or cream sales	76	49	64.5	53.5	75.5
Pounds of milk produced per cow	76	16	21.1	11.7	30.5
Pounds of butterfat produced per cow	71	10	14.1	5.8	22.4
Feed costs per 100 pounds of milk produced	76	12	15.8	7.4	24.2
Labor costs per 100 pounds of milk produced	76	7	9.2	-	-
Returns above value of feed fed	76	20	26.3	16.2	36.4
Returns per $100 of feed fed	76	13	17.1	8.5	25.7
Labor costs per cow	76	5	6.6	-	-
Gross income per cow	76	14	18.4	9.5	27.3
Net profit (or loss) from dairy herd	76	43	56.6	45.2	68.0
Net profit (or loss) per cow	76	14	18.4	9.5	27.3

[a]Includes only those operators for which the item or measure is applicable; 76 operators had five or more dairy cows in 1965.

following relationships existed within the population of Iowa farm operators.

1. Farmers who had received instruction in farm management, accounting, and record analysis possessed better business record and analysis systems than those operators who had not had such instruction.

2. Younger operators with less farming experience kept better records and made more use of them for analysis purposes than older and more experienced farmers.

3. As the size of the farm business (gross farm income) increased, the estimated mean RK-A index scores of the overall farm business and individual enterprises also increased.

4. Operators who earned a greater proportion of their 1965 net incomes from off-farm sources generally possessed the best farm record and analysis systems.

5. As net worth of the operator increased, up to $75,000, the RK-A index scores also increased; however, the operators with net worths of $75,000 and over generally kept and used records to a lesser degree.

6. Farmers who rented either part or all of their land base kept better enterprise records and made more use of them than owner-operators.

7. Farmers who had completed three to four years of high school vocational agriculture kept better livestock enterprise records and made more analysis of them than operators who completed less vocational agriculture instruction.

Implications

The educational implications of these results and the recommendations made were as follows: (1) instruction in farm management, accounting, and record analysis is greatly needed by both present and prospective farmers; (2) vocational agriculture can capably provide such instruction and training, and should increase emphasis upon management and decision-making in both the day-school program and out-of-school adult and young farmer groups; (3) the agricultural extension service should expand programs such as the farm and home development program, which concentrates upon the farm family as an integral decision-making unit; (4) area vocational-techinical schools should include in their program structure provisions for management, accounting, and record keeping education of both present and prospective farmers; (5) universities and land-grant colleges should continue to provide instruction in farm management and business analysis for both prospective farmers and those individuals who are preparing to become agricultural educators, and should also provide leadership in developing in-service training programs for those presently involved in farmer education; (6) possibilities exist for professional tax consultants to make an educational contribution in management and record analysis; and (7) all educational instructions and agencies should endeavor to motivate farm managers to keep and use better business records as decision-making tools.