AN ANALYSIS OF PROFITABILITY FACTORS FOR SELECTED FARMING TYPES IN THE MINNESOTA VOCATIONAL AGRICULTURE FARM MANAGEMENT EDUCATION PROGRAM

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This study is derived from the guidelines used to develop the Minnesota Vocational Agriculture Farm Management Education Program. One of the objectives addresses the need for current, reliable information useful in teaching farm management.

Currently, more than 40 percent of the approximately 8,000 farm operators in the Minnesota Adult Farm Management Education Program derive 80 percent or more of their cash income from one or two farm business enterprises. Specific types of these specialized farms (i.e., crops, diary, swine, etc.) require substantially different inputs and resources to operate. Therefore, it is reasonable to suggest that the manner in which we interpret the year-end business analysis for specialized farms, based on selected evaluative measures, might be quite different than the current method of assessment which generally summarizes all farms in a geographic area as one group.

The continuing trend toward highly specialized and, consequently, high risk farming generates the need for additional information about the specific relationship of selected production factors to labor earnings. If farm management instructors are to provide timely and useful information, the profit characteristics of these specialized farms must be examined. A long term study of profitability factor relationship to labor earnings will provide new insights which will have an impact on the teaching strategies employed in the current Farm Management Education Program and provide additional management information for its clientele.

Objectives of the Study

The purpose of this study was to determine the impact profitability factors have on farm labor earnings for farms enrolled in the Minnesota Vocational Agriculture Farm Management Education Program. These specialized farms received 80 percent or more of their cash income from one or two farming enterprises with a minimum of 20 percent cash income from the second enterprise.

Specific objectives of this study were:

1. To determine the relationship of profitability factors, as defined in the farm business analysis, to labor earnings by farm enterprise type on an annual basis.

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2. To examine the consistency of the relationship of profitability factors to labor earnings over a period of four years.

3. To develop teaching strategies which will aid in classroom and on-farm instruction in the management education program, using the information derived from the analysis of the two previous objectives. (This objective is not reported in this article.)

Sample

The sample for this study was comprised of farms registered a minimum of one year in the Minnesota program and which successfully completed one or more farm business analyses. The records used meet the "specialized farming type" criterion. The computational formula for the criterion is based on historical usage and is identical to that used in the "Types of Farming in Minnesota" farm business record series jointly published by the Agricultural Education Division and the Department of Agricultural and Applied Economics, St. Paul Campus, University of Minnesota.

Research Design and Procedure

A total of 7,138 specialized farms were selected in 11 farm categories from 1972 through 1975. The numerical breakdown is as follow:

Farm Type	No. of Farms
Dairy farms - under 34 cows	1,236
Dairy farms - 34 to 54 cows	858
Dairy farms - 55 or more cows	344
Dairy and hog farms	307
Hog complete farms	163
Cash crop farms	1,496
Dairy and cash crop farms	1,231
Hog complete and cash crop farms	842
Hog finishing and cash crop farms	210
Feeder cattle and cash crop farms	264
Beef breeding and cash crop farms	187
TOTAL	7,138

The profitability factors examined in this study were taken from Table 8 of each farm business summary which met the "specialized farm type" criteron. The factors are:

Whole farm labor earning
Crop yield index
Gross return per cropped acre
Index return per $100 of feed fed
Livestock intensity per 100 acres

Total work units
Work units per worker
Power, machinery, equipment and building expense per work unit
Capital investment per worker

These factors were examined through a breakdown of the 11 farm types over four years creating 44 subsets of information for each analysis procedure. The methods of analysis for these subsets of data are:

Mean of whole farm labor earning groups compiled by increments of profitability factor achievement
Mean and standard deviation of all variables
Correlation matrices developed through the use of the Pearson Product Moment Correlation
Forward multiple stepwise regression models
Rank ordering of variables as developed by the regression models

Findings of the Study

The findings of this study are as follows:

1. All specialized farm types investigated comprise approximately 45 percent of the total number of farms in the Minnesota Vocational Agriculture Farm Management Education Program.

2. Mean of the profitability factors and labor earnings indicated the specialized farms were generally similar in size, efficiency, and cost when compared to the total population in the Minnesota Vocational Agricultural Farm Management Education Program.

3. Specific farm types demonstrated individual differences when the mean of the profitability factor was compared with other specialized farm types.

4. The widely used evaluation of labor earning levels through the method of adding profit factor categories for those equaling or surpassing the group mean was not consistent with the results of this study. This method does not allow for the high contribution of some profitability factors and the minor or negative contributions of other factors.

5. Forty-three of the 44 regression models which examined the four years of data for the 11 farm types were statistically related to whole farm labor earnings at the five percent level of significance.

6. The regression models predicted the percentage of labor earnings in a range from 13.3 to 90.3 percent of the total. Eighty percent of the 44 models were able to predict from 30 to 70 percent of whole farm labor earnings.

7. Three variables were consistently important in predicting whole farm labor earnings when examined over a four-year period by two principle farm groups: a) livestock only farms and b) livestock and crop farms. These variables were: 1) index return per $100 of feed fed, 2) total work units, and 3) gross return per cropped acre.

8. Three variables important in predicting whole farm labor earnings for cash crop farms were: 1) total work units, 2) work units per worker, and 3) crop yield index.

9. The three sizes of dairy farms in this study had identical variables ranked in first and second place. Index return per $100 of feed fed was ranked number one and gross return per cropped acre was ranked number two for all dairy farms.

10. Four farm types had total work units and index return per $100 of feed fed as the first- and second-best predictors of whole farm labor earnings. The farm types were: 1) dairy and hog farms, 2) hog complete farms, 3) hog complete and crop farms and 4) hog finishing and crop farms.

11. Two farm types had index return per $100 of feed fed and total work units as the first- and second-best predictors of whole farm labor earnings. The farm types were: 1) dairy and crop farms, and 2) feeder cattle and crop farms.

Conclusions

Based on the information developed from this study, the following conclusions are offered:

1. Specialized farm types, as defined in this study, make up almost half of the clientele in the Minnesota Vocational Agriculture Adult Farm Management Education Program. This provides a broad base for application of the findings from this study.

2. The profitability factors, as found in Table 8 of the Annual Farm Business Analysis Report, are related to whole farm labor earnings in a reasonably predictable and consistent manner.

3. Three of the factors predict labor earnings with enough consistency over years and among farm types to be of practical value for planning and decision making. Ranked in order of importance, they are total work units or size of business, index return per $100 of feed fed, and gross return per cropped acre.

4. When all specialized farm types are analyzed together for predictors of whole farm labor earnings, two factors are relatively equal in importance. They are business size (total work units) and feeding efficiency (index return per $100 of feed fed). Gross return per cropped acre also determines whole farm labor earnings but to a lesser degree.

5. Feeding efficiency is the most important predictor of labor earnings in all sizes of dairy farms in this study. This indicates the feeding program and its management is of critical importance to the successful operation of the dairy operation.

   The second most important predictor for dairy farms is the gross return received from the cropping program. This supports the contention of many farm managers that a strong cropping program is integral to a successful dairy operation.

   Business size (total work units) is the third best predictor of labor earnings by dairy herd size. The variable may have been of greater importance if all three dairy categories were placed in a common group so the continuum relating to size could have been further examined.

6. An analysis of all specialized farm types containing hogs indicates business size is the most important predictor of whole farm labor earnings. This is complemented by the second most important variable which is feeding efficiency. Without the support of an excellent feeding program, business size would be of little or negative value in its association to labor earnings.

7. Business size is the most important predictor of whole farm labor earnings for cash crop farms. This is complemented by the factor crop yield index which accounts for the production from the tillable farm land. Business size would not be a good predictor of labor earnings if it were not supported by a well managed cropping program.

References

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